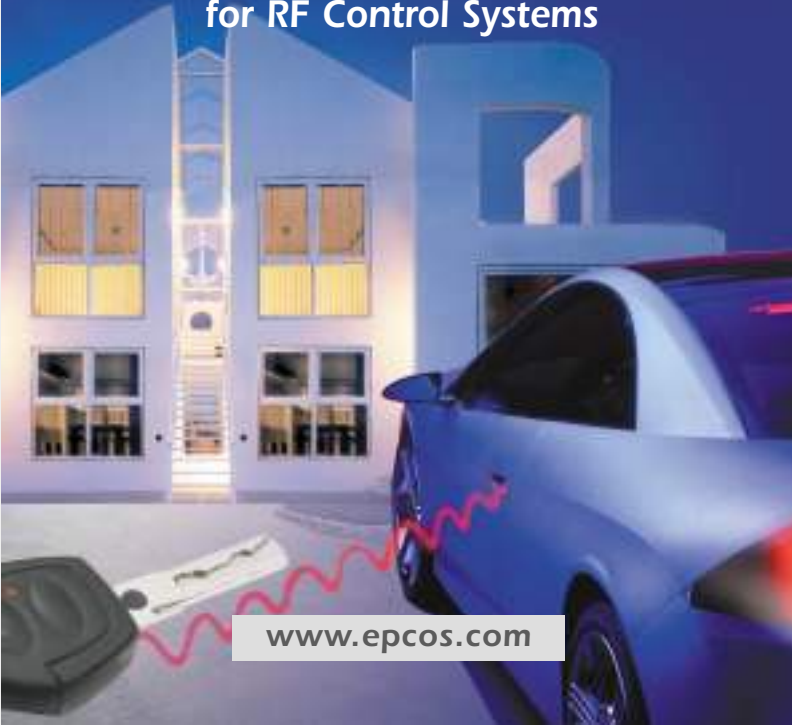




# SAW

Surface Acoustic Wave Components  
for RF Control Systems



[www.epcos.com](http://www.epcos.com)

# Applications



## Automotive

■ Remote keyless entry



■ Tire-pressure monitoring



■ Automotive telematics



## Security and Access

■ Fire alarm, burglar alarm



■ Access control and tagging



## Home Convenience

■ Wireless switches



■ Meter reading



■ Garage-door openers



■ Wireless audio





# Introduction

## What are SAW components used for?

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In remote control applications, **SAW resonators** provide stable frequencies for the RF carrier signal to **transmit** data over a range of 10 to 300 m or for the local oscillators of superhet receivers.

The **front-end filter** in the **receiver** eliminates interference from the incoming RF signal, thus increasing selectivity and sensitivity in short-range devices.

## Benefits

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- SAW resonators with tight frequency tolerances:  
±100/±75/±50 kHz
- Identical pinning for all standard frequencies in each package size
- Hermetically sealed SMD packages allow the SAW components to operate even in extremely hostile environments:
  - Extended operating temperature range from –40 °C up to +125 °C
  - Improved shock and vibration strength thanks to stress-free cold seam-welding of the metal lid
- Enhanced reliability (particle protection) and reduced aging by patented PROTEC® and ELPAS® technologies
- 100% final examination
- All EPCOS factories are certified to automotive standard ISO/TS 16949
- Component qualification to automotive test procedure AEC-Q200
- Full level 3 PPAP available
- Unique production know-how and volume benefits from the world market leader in SAW components:  
“No less than three million SAW components leave our factories every day”



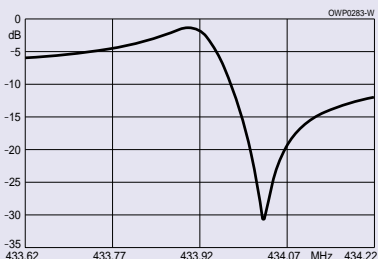
# Resonators

## General characteristics

- **Center frequency tolerance**  $\pm 50$  kHz;  $\pm 75$  kHz;  
 $\pm 100$  kHz
- **Insertion loss**  $< 1.5$  dB (typ.)
- **Substrate** Quartz
- **Passivation** PROTEC<sup>®</sup>, ELPAS<sup>®</sup>
- **Package** DCC6C, QCC4A, QCC8C

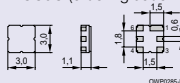
### Example for R900

Transfer function

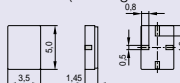


### Outline drawings

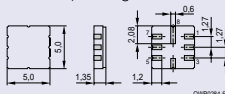
DCC6C (ordering code: "-U410"):



QCC4A (ordering code: "-H210"):



QCC8C (ordering code: "-U310"):



## Main representatives

| $f_c$<br>[MHz]              | $f_c$ tolerance<br>[kHz] | Ordering code            | Market |
|-----------------------------|--------------------------|--------------------------|--------|
| <b>1-port configuration</b> |                          |                          |        |
| 315.02                      | $\pm 50$                 | B39321 <b>R851</b> H210  | USA    |
| 315.00                      | $\pm 75$                 | B39321 <b>R901</b> U410  | USA    |
| 315.00                      | $\pm 100$                | B39321 <b>R981</b> U410  | USA    |
| 315.50                      | $\pm 75$                 | B39321 <b>R903</b> U410  | China  |
| 433.94                      | $\pm 50$                 | B39431 <b>R850</b> H210  | Europe |
| 433.92                      | $\pm 75$                 | B39431 <b>R900</b> U410  | Europe |
| 433.92                      | $\pm 100$                | B39431 <b>R980</b> U410  | Europe |
| 868.30                      | $\pm 75$                 | B39871 <b>R858</b> H210  | Europe |
| <b>2-port configuration</b> |                          |                          |        |
| 433.92                      | $\pm 75$                 | B39431 <b>R2701</b> U310 | Europe |
| 868.30                      | $\pm 100$                | B39871 <b>R2711</b> U310 | Europe |
| 915.00                      | $\pm 350$                | B39921 <b>R2706</b> U310 | USA    |



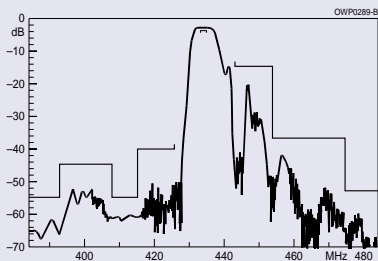
# Wideband Filters

## General characteristics

|                          |   |
|--------------------------|---|
| ■ Usable bandwidth       | Typically 1 to 3 MHz                                  |
| ■ Substrate              | Lithium tantalate                                     |
| ■ Passivation            | ELPAS®  |
| ■ Input/output impedance | 50 Ω matched  |
| ■ Selectivity            | Suitable for systems with IF=10.7 MHz                 |
| ■ Remarks                | Excellent for fixed frequency and channelized systems |
| ■ Package                | DCC6C, QCC8B  |

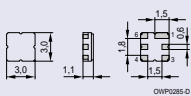
### Example for B3710

Transfer function

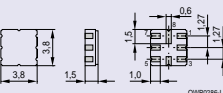


### Outline drawings

DCC6C (ordering code: "-U410"):



QCC8B (ordering code: "-Z810"):



## Main representatives

| $f_c$<br>[MHz] | Usable band-<br>width [MHz] | Ordering code            | Market                  |
|----------------|-----------------------------|--------------------------|-------------------------|
| 312.20         | 2.0                         | B39311 <b>B3712</b> U410 | Japan                   |
| 315.00         | 1.0                         | B39321 <b>B3711</b> U410 | USA                     |
| 433.92         | 1.7                         | B39431 <b>B3710</b> U410 | Europe                  |
| 864.00         | 3.0                         | B39861 <b>B3563</b> U410 | Europe (wireless audio) |
| 869.00         | 2.0                         | B39871 <b>B3715</b> U410 | Europe                  |
| 915.00         | 26.0                        | B39921 <b>B3588</b> U410 | USA                     |
| 1575.00        | 2.4                         | B39162 <b>B3521</b> U410 | GPS worldwide           |
| 2450.00        | 97.0                        | B39252 <b>B4041</b> U410 | worldwide               |



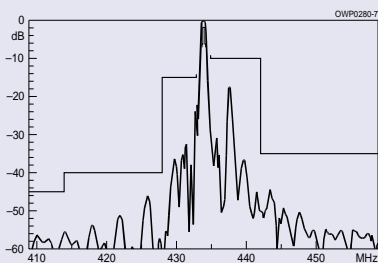
# Narrowband Filters

## General characteristics

|   |  |
|---|--|
| <ul style="list-style-type: none"> <li>■ Usable bandwidth</li> <li>■ Substrate</li> <li>■ Passivation</li> <li>■ Input/output impedance</li> <li>■ Selectivity</li> <br/> <li>■ Remarks</li> <br/> <li>■ Package</li> </ul> | <p>Approximately 0.3 to 0.6 MHz<br/>           Quartz<br/>           PROTEC®, ELPAS®<br/> <math>&gt; 50 \Omega</math><br/>           Excellent, especially close to the carrier frequency<br/>           Well suited for Europe – avoids interference caused by the Tetra system<br/>           QCC8B, QCC8C</p> |
|---|--|

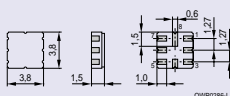
### Example for B3760

Transfer function

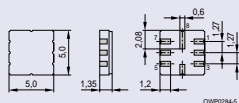


### Outline drawings

QCC8B (ordering code: "-Z810"):



QCC8C (ordering code: "-U310"):



## Main representatives

| $f_c$<br>[MHz] | Usable band-<br>width [MHz] | Ordering code            | Market |
|----------------|-----------------------------|--------------------------|--------|
| 312.20         | 0.36                        | B39311 <b>B3766</b> Z810 | Japan  |
| 315.00         | 0.36                        | B39321 <b>B3761</b> Z810 | USA    |
| 315.15         | 0.36                        | B39321 <b>B3763</b> Z810 | China  |
| 315.50         | 0.36                        | B39321 <b>B3765</b> Z810 | China  |
| 433.92         | 0.36                        | B39431 <b>B3760</b> Z810 | Europe |
| 447.73         | 0.36                        | B39451 <b>B3767</b> Z810 | Korea  |
| 868.30         | 0.60                        | B39871 <b>B3762</b> Z810 | Europe |

# Ultra-Narrowband Filters

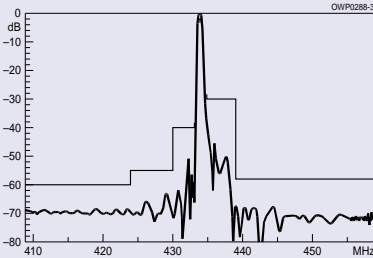


## General characteristics

|   |  |
|---|--|
| <ul style="list-style-type: none"> <li>■ Usable bandwidth</li> <li>■ Substrate</li> <li>■ Passivation</li> <li>■ Input/output impedance</li> <li>■ Selectivity</li> <br/> <li>■ Remarks</li> <br/> <li>■ Package</li> </ul> | <p>Approximately 0.1 to 0.3 MHz<br/>                     Quartz<br/>                     PROTEC®, ELPAS®<br/>                     &gt; 50 Ω</p> <p>Very steep skirts close to the carrier frequency<br/>                     Excellent image-frequency rejection; needs external coupling coil</p> <p>QCC8B, QCC8C</p> |
|---|--|

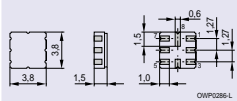
### Example for B3575

Transfer function

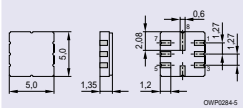


### Outline drawings

QCC8B (ordering code: "-Z810"):



QCC8C (ordering code: "-U310"):



## Main representatives

| $f_c$<br>[MHz] | Usable band-<br>width [MHz] | Ordering code            | Market |
|----------------|-----------------------------|--------------------------|--------|
| 315.00         | 0.20                        | B39321 <b>B3576</b> U310 | USA    |
| 433.42         | 0.22                        | B39431 <b>B3567</b> U310 | Europe |
| 433.92         | 0.12                        | B39431 <b>B3790</b> Z810 | Europe |
| 433.92         | 0.22                        | B39431 <b>B3575</b> U310 | Europe |
| 868.30         | 0.28                        | B39971 <b>B3574</b> U310 | Europe |

# Contacts



## Your sales partners worldwide

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Internet: [www.epcos.com](http://www.epcos.com) – See Sales Offices & Distributors

## Further product information

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- Automotive SAW Application (Toolkit)  
CD ROM, English: EPC:20002-7600
- Data sheets for complete product range:  
[www.epcos.com/rke](http://www.epcos.com/rke)

## EPCOS at a Glance

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EPCOS is the successor to Siemens Matsushita Components and manufactures some 40,000 electronic components, such as capacitors, ceramic components, surface acoustic wave (SAW) components and ferrites. The company serves the fastest growing and technologically most demanding markets: information + communications, automotive, industrial and consumer electronics. EPCOS, with headquarters in Munich, Germany, is the market leader in Europe and no.2 worldwide and has R&D locations, production plants and sales centers in over 100 countries.



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