



## Product Brief 2011

# Surface Acoustic Wave Components

## for RF Control Systems

### What are SAW components used for?

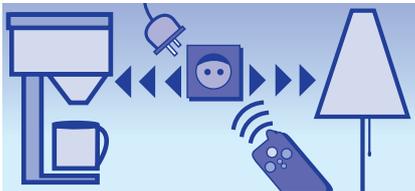
SAW components are key elements for wireless transmission. Front-end filters eliminate interference from the incoming RF signals in receivers, thus increasing selectivity and sensitivity of short-range devices. Resonators provide stable frequencies for the RF carrier signals of remote control applications, or for local oscillators of superhet receivers.

### Benefits

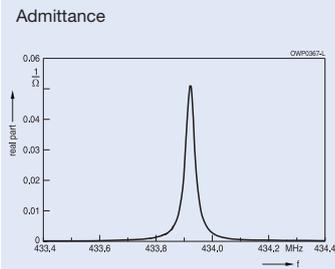
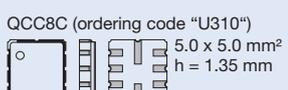
- SAW filters in SMD ceramic and automotive CSSP package
- SAW resonators with tight frequency tolerances:  $\pm 25/\pm 50$  kHz
- Identical pinning for all standard frequencies in each package size
- 100% final examination
- Operating temperature range from  $-40$  °C up to  $+125$  °C
- Patented passivation technologies for enhanced reliability
- 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
- RoHS compliant (2002/95/EC)
- Lead-free soldering compatible with J-STD 20C
- Helps to fulfill ETSI EN 300 220 and FCC Part 15



# Applications

Automotive	Industrial	Home
 Remote keyless entry	 Advanced metering infrastructure	 Wireless switches
 Tire-pressure monitoring	 Container tagging	 Garage-door openers
 Automotive telematics / navigation	 Fire alarm, burglar alarm	 Wireless audio
 Automotive toll systems	 Radio modules	 Remote controls

# Resonators

Example for R990	Outline drawings	Main representatives																																															
<p>Admittance</p> 	<p>DCC4B (ordering code "B910") 2.5 x 2.0 mm<sup>2</sup> h = 0.86 mm</p>  <p>DCC6E/DCC6G (ordering code "H110/A310") 3.0 x 3.0 mm<sup>2</sup> h = 1.0 mm</p>  <p>QCC8C (ordering code "U310") 5.0 x 5.0 mm<sup>2</sup> h = 1.35 mm</p> 	<table border="1"> <thead> <tr> <th>f<sub>c</sub> [MHz]</th> <th>f<sub>c</sub> tolerance [kHz]</th> <th>Ordering code</th> <th>Remark</th> </tr> </thead> <tbody> <tr><td>314.90</td><td>±25</td><td>B39311R 994H110</td><td>USA, China</td></tr> <tr><td>315.00</td><td>±50</td><td>B39321R1801B910</td><td>USA, China</td></tr> <tr><td>315.00</td><td>±50</td><td>B39321R 961H110</td><td>USA, China (RKE)</td></tr> <tr><td>315.00</td><td>±25</td><td>B39321R 991H110</td><td>USA, China</td></tr> <tr><td>314.875/ 315.125</td><td>±50</td><td>B39311R 771U310</td><td>USA (RKE) 2in1</td></tr> <tr><td>433.92</td><td>±50</td><td>B39431R1900A310</td><td>Europe, China</td></tr> <tr><td>434.42</td><td>±50</td><td>B39431R 969H110</td><td>Europe, China (RKE)</td></tr> <tr><td>433.92</td><td>±25</td><td>B39431R 990H110</td><td>Europe, China (RKE)</td></tr> <tr><td>433.795/ 434.045</td><td>±50</td><td>B39431R 770U310</td><td>Europe (RKE) 2in1</td></tr> <tr><td>915.00</td><td>±250</td><td>B39921R2906H110</td><td>USA 2-port</td></tr> </tbody> </table>	f <sub>c</sub> [MHz]	f <sub>c</sub> tolerance [kHz]	Ordering code	Remark	314.90	±25	B39311R 994H110	USA, China	315.00	±50	B39321R1801B910	USA, China	315.00	±50	B39321R 961H110	USA, China (RKE)	315.00	±25	B39321R 991H110	USA, China	314.875/ 315.125	±50	B39311R 771U310	USA (RKE) 2in1	433.92	±50	B39431R1900A310	Europe, China	434.42	±50	B39431R 969H110	Europe, China (RKE)	433.92	±25	B39431R 990H110	Europe, China (RKE)	433.795/ 434.045	±50	B39431R 770U310	Europe (RKE) 2in1	915.00	±250	B39921R2906H110	USA 2-port			
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<p><b>General characteristics</b></p> <ul style="list-style-type: none"> <li>• <b>Center frequency tolerance:</b> ±25 kHz; ±50 kHz</li> <li>• <b>Insertion loss:</b> &lt; 1.5 dB (typ.)</li> <li>• <b>Substrate:</b> Quartz</li> <li>• <b>Packages:</b> DCC4B, DCC6E, DCC6G, QCC8C</li> </ul>																																																	

# Narrowband Filters

Example for B3743	Outline drawings
<p>Transfer function</p>	<p>DCC6F (ordering code "B210")              2.0 x 2.5 mm<sup>2</sup>            h = 0.86 mm</p> <p>DCC6E (ordering code "H110")              3.0 x 3.0 mm<sup>2</sup>            h = 1.0 mm</p> <p>QCC8B (ordering code "Z810")              3.8 x 3.8 mm<sup>2</sup>            h = 1.5 mm</p>

Main representatives			
f <sub>c</sub> [MHz]	Usable bandwidth [MHz]	Ordering code	Remark
312.15/314.67	0.36/0.99	B39311B3785Z810	Japan, USA (double hump filter)
314.90	0.36	B39311B3739H110	USA
315.00	0.36	B39321B3961B210	USA, China
315.00	0.36	B39321B3741H110	USA, China
315.00	0.55	B39321B3939H110	USA, China (multi channel)
315.00	1.1	B39321B3783Z810	USA, China (multi channel)
433.42	0.36	B39431B3735H110	Europe
433.92	0.12	B39431B3790Z810	Europe, China
433.92	0.12	B39431B3933H110	Europe, China
433.92	0.34	B39431B3743H110	Europe, China
433.92	0.34	B39431B3960B210	Europe, China
433.92	0.55	B39431B3936H110	Europe, China (multi channel)
433.92	1.0	B39431B3935H110	Europe, China (multi channel)
433.92	1.1	B39431B3782Z810	Europe, China (multi channel)
434.42	0.36	B39431B3748H110	Europe
447.725	0.29	B39451B3737H110	Korea
868.30	0.60	B39871B3744H110	Europe
868.30	0.6	B39871B3962B210	Europe
902.875	1.55	B39901B3934H110	USA

## General characteristics

- **Usable bandwidth:** Typically 0.1 ... 0.6 MHz
- **Substrate:** Quartz
- **Input/output impedance:** > 50 Ω
- **Selectivity:** Excellent nearby rejection
- **Package:** DCC6F, DCC6E, QCC8B

# Wideband Filters for ISM

Example for B3721	Outline drawings
<p>Transfer function</p>	<p>DCC6 (ordering code "Z610")              3.8 x 3.8 mm<sup>2</sup>            h = 1.5 mm</p> <p>DCC6C (ordering code "U410")              3.0 x 3.0 mm<sup>2</sup>            h = 1.1 mm</p> <p>DCC6E (ordering code "H110")              3.0 x 3.0 mm<sup>2</sup>            h = 1.0 mm</p> <p>QCS5P (ordering code "F210/P810")              1.4 x 1.1 mm<sup>2</sup>            h = 0.45 mm</p>

Main representatives			
f <sub>c</sub> [MHz]	Usable bandwidth [MHz]	Ordering code	Remark
313.85	1.0	B39311B3729H110	Japan (pinning 1-4)
315.00	1.0	B39321B3722U410	USA, China
433.92	1.6	B39431B3721U410	Europe, China
864.00	2.0	B39861B3706Z610	Europe
866.50	7.0	B39871B3717U410	Europe (RFID)
869.00	2.0	B39871B3725U410	Europe
915.00	26	B39921B3588U410	USA (Meter Reading, ISM)
915.00	26	B39921B4301F210	USA (Meter Reading, ISM), CSSP automotive
2448.5	97.0	B39242B3912U410	World (ISM)

## General characteristics

- **Usable bandwidth:** Typically 1 ... 3 MHz
- **Substrate:** Lithium tantalate
- **Input/output impedance:** 50 Ω
- **Selectivity:** High ultimate rejection
- **Remarks:** Excellent for fixed frequency and channelized systems, low insertion attenuation
- **Packages:** DCC6, DCC6C, DCC6E, QCS5P

# Wideband Filters for Telematics

## Example for B4300



## Outline drawings

DCC4A (ordering code "B710")				2.5 x 2.0 mm <sup>2</sup> h = 0.86 mm
DCC6C/DCC6D (ordering code "U410/U510")				3.0 x 3.0 mm <sup>2</sup> h = 1.1 mm
QCS5M and QCS5P (ordering code "F210/P810")				1.4 x 1.1 mm <sup>2</sup> h = 0.45 mm
QCS10W (ordering code "F210/P810")				1.4 x 1.1 mm <sup>2</sup> h = 0.45 mm
QCC10G (ordering code "H910")				3.0 x 2.5 mm <sup>2</sup> h = 0.98 mm

## General characteristics

- **Usable bandwidth:** Typically 2 ... 60 MHz
- **Substrate:** Lithium tantalate
- **Input/output impedance:** 50/50 Ω, 50/100 Ω, 50/150 Ω
- **Selectivity:** High ultimate rejection
- **Remarks:** Frequencies for GPS/Galileo/Glonass and GSM/CDMA/UMTS available in CSSP package qualified acc. to AEC-Q200 Grade 3
- **Packages:** DCC4A, DCC6C, DCC6D, QCS5M, QCS5P, QCS10W, QCC10G

## Main representatives

f <sub>c</sub> [MHz]	Usable bandwidth [MHz]	Ordering code	Remark
881.50	25	B39881B4303F210	Band V Rx, unb./bal. 50/150 Ω
942.50	35	B39941B4304F210	Band VIII Rx
881.50/942.50	25.0/35.0	B39941B4380P810	Dual Band V/VIII Rx
881.50/942.50	25.0/35.0	B39941B3514H910	Dual Band V/VIII Rx
1575.42	6.0	B39162B4300F210	GPS/Galileo unb./unb., CSSP automotive
1575.42	2.0	B39162B4308P810	GPS/Galileo unb./bal., CSSP automotive
1575.42	2.0	B39162B3521U410	GPS unb./unb., high selectivity
1575.42	2.4	B39162B3520U410	GPS/Galileo unb./unb., low IA*
1575.42	6.0	B39162B3524B710	GPS/Galileo unb./unb., 2x2.5mm package
1575.42	6.0	B39162B3525U510	GPS/Galileo unb./bal.
1575.42	2.0	LY89**	GPS extractor filter
1585.5	41	B39162B3519U410	GPS/Galileo/Glonass, unb./unb.
1586.00	42	B39162B3517U510	GPS/Galileo/Glonass, unb./bal.
1601.50	17	B39162B3529U410	Russia (Glonass)
1575.00/1602.00	10.0/10.0	B39162B3518H910	GPS/Galileo/Glonass Diplexer
1732.5	45	B39172B4307F210	Band IV Tx
1842.5	60	B39182B4306F210	Band III Rx
1950.0	60.0	B39202B4309P810	Band I Tx
1960	60	B39202B4305F210	Band II Rx
1842.5/1960.0	75.0/60.0	B39202B3515H910	Dual Band III/II Rx
1842.5/1960.0	75.0/60.0	B39202B4381P810	Dual Band III/II Rx
2140.0	60.0	B39212B4302F210	Band I Rx
1575.42/2326.25	2.046/12.5	B39232B3526U510	GPS/SDARS Diplexer, extension to XM band under development

\* Insertion attenuation

\*\* Development code

**Important information:** Some parts of this publication contain statements about the suitability of our products for certain areas of application. These statements are based on our knowledge of typical requirements that are often placed on our products. We expressly point out that these statements cannot be regarded as binding statements about the suitability of our products for a particular customer application. It is incumbent on the customer to check and decide whether a product is suitable for use in a particular application. This publication is only a brief product survey which may be changed from time to time. Our products are described in detail in our data sheets. The *Important notes* ([www.epcos.com/ImportantNotes](http://www.epcos.com/ImportantNotes)) and the product-specific *Cautions and warnings* must be observed. All relevant information is available through our sales offices.