



# *SAW Components*

*Data Sheet B3760*

Data Sheet

An abstract graphic featuring the word "EPCOS" in large, glowing, 3D letters. The letters are white with a blue glow and are positioned diagonally across the frame. In the background, there is a faint, stylized globe with circuitry patterns, suggesting a global network or technological theme. The overall color scheme is dark with blue and white highlights.



## SAW Components

B3760

### Low-loss Filter

433,92 MHz

#### Data Sheet

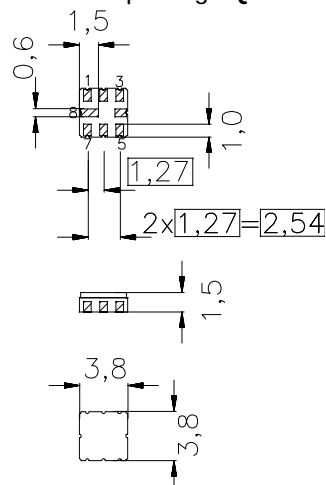
#### Features

- RF low-loss filter for remote control receivers
- Package for **Surface Mounted Technology (SMT)**
- Balanced and unbalanced operation possible
- Passivation layer: Elpas
- AEC-Q200 qualified component family
- Compliant to RoHS
- Lead free soldering: J - STD20C

#### Terminals

- Ni, gold plated

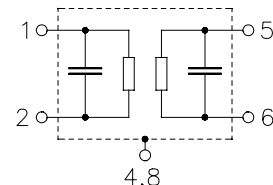
Ceramic package QCC8B



typ. dimensions in mm, approx. weight 0,07 g

#### Pin configuration<sup>1)</sup>

- 1 Input Ground (recommended) or Input
- 2 Input (recommended) or Input Ground
- 5 Output (recommended) or Output Ground
- 6 Output Ground (recommended) or Output
- 4,8 Case - Ground
- 3,7 to be grounded



| Type  | Ordering code     | Marking and package according to | Packing according to |
|-------|-------------------|----------------------------------|----------------------|
| B3760 | B39431-B3760-Z810 | C61157-A7-A46                    | F61074-V8167-Z000    |

Electrostatic Sensitive Device (ESD)

#### Maximum ratings

|                            |           |          |     |                              |
|----------------------------|-----------|----------|-----|------------------------------|
| Operable temperature range | $T_A$     | -45/+120 | °C  |                              |
| Storage temperature range  | $T_{stg}$ | -45/+120 | °C  |                              |
| DC voltage                 | $V_{DC}$  | 6        | V   |                              |
| Source power               | $P_S$     | 10       | dBm | source impedance 50 $\Omega$ |

<sup>1)</sup> The recommended pin configuration usually offers best suppression of electrical crosstalk. The filter characteristics refer to this configuration.



|                        |                   |
|------------------------|-------------------|
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### Characteristics

|                               |                                        |
|-------------------------------|----------------------------------------|
| Reference temperature:        | $T_A = -40 \dots +95^\circ \text{C}$   |
| Terminating source impedance: | $Z_S = 50 \Omega$ and matching network |
| Terminating load impedance:   | $Z_L = 50 \Omega$ and matching network |

|                                                                                            |                       | min. | typ.                | max. |                              |
|--------------------------------------------------------------------------------------------|-----------------------|------|---------------------|------|------------------------------|
| <b>Center frequency</b><br>(center frequency between 3 dB points)                          | $f_c$                 | —    | 433,92              | —    | MHz                          |
| <b>Minimum insertion attenuation</b><br>including loss in matching elements ( $Q_L = 47$ ) | $\alpha_{\min}$       | —    | 1,9                 | 2,6  | dB                           |
| excluding loss in matching elements                                                        |                       | —    | 1,6                 | 2,3  | dB                           |
| <b>Pass band</b> (relative to $\alpha_{\min}$ )                                            |                       |      |                     |      |                              |
| 433,76 ... 434,08 MHz                                                                      |                       | —    | 0,5                 | 2,0  | dB                           |
| 433,74 ... 434,10 MHz                                                                      |                       | —    | 0,7                 | 3,0  | dB                           |
| 433,70 ... 434,14 MHz                                                                      |                       | —    | 1,0                 | 6,0  | dB                           |
| <b>Pass bandwidth</b>                                                                      |                       |      |                     |      |                              |
| $\alpha_{\text{rel}} \leq 3 \text{ dB}$                                                    |                       | 0,62 | 0,68                | 0,74 | MHz                          |
| <b>Relative attenuation</b> (relative to $\alpha_{\min}$ )                                 | $\alpha_{\text{rel}}$ |      |                     |      |                              |
| 10,00 ... 414,00 MHz                                                                       |                       | 52   | 56                  | —    | dB                           |
| 414,00 ... 423,50 MHz                                                                      |                       | 48   | 52                  | —    | dB                           |
| 423,50 ... 431,72 MHz                                                                      |                       | 29   | 34                  | —    | dB                           |
| 431,72 ... 432,12 MHz                                                                      |                       | 26   | 35                  | —    | dB                           |
| 432,12 ... 433,10 MHz                                                                      |                       | 17   | 21                  | —    | dB                           |
| 434,92 ... 442,00 MHz                                                                      |                       | 18   | 21                  | —    | dB                           |
| 442,00 ... 500,00 MHz                                                                      |                       | 40   | 45                  | —    | dB                           |
| 500,00 ... 700,00 MHz                                                                      |                       | 50   | 55                  | —    | dB                           |
| 700,00 ... 805,00 MHz                                                                      |                       | 45   | 50                  | —    | dB                           |
| 805,00 ... 1000,00 MHz                                                                     |                       | 60   | 65                  | —    | dB                           |
| <b>Impedance</b> for pass band matching <sup>1)</sup>                                      |                       |      |                     |      |                              |
| Input: $Z_{\text{IN}} = R_{\text{IN}} \parallel C_{\text{IN}}$                             |                       | —    | 240 $\parallel$ 2,4 | —    | $\Omega \parallel \text{pF}$ |
| Output: $Z_{\text{OUT}} = R_{\text{OUT}} \parallel C_{\text{OUT}}$                         |                       | —    | 240 $\parallel$ 2,4 | —    | $\Omega \parallel \text{pF}$ |

<sup>1)</sup> Impedance for passband matching bases on an ideal, perfect matching of the SAW filter to source- and to load impedance (here 50 Ohm). After the SAW filter is removed and input impedance into the input matching / output matching network is calculated.

The conjugate complex value of these characteristic impedances are the input and output impedances for flat passband. For more details, we refer to EPCOS application note #4.



## SAW Components

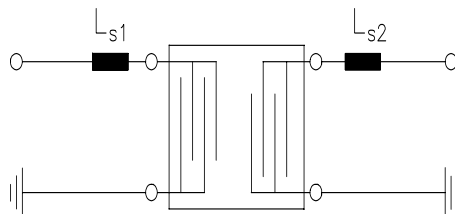
B3760

### Low-loss Filter

433,92 MHz

#### Data Sheet

**Matching network to 50  $\Omega$**  (element values depend on pcb layout and equivalent circuit)



$$L_{s1} = 33 \text{ nH}$$

$$L_{s2} = 33 \text{ nH}$$

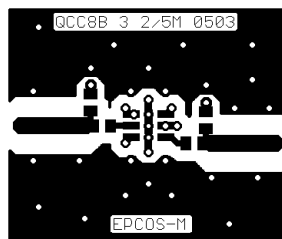
#### Minimising the crosstalk

For a good ultimate rejection a low crosstalk is necessary. Low crosstalk can be realised with a good RF layout. The major crosstalk mechanism is caused by the "ground-loop" problem.

Grounding loops are created if input-and output transducer GND are connected on the top-side of the PCB and fed to the system grounding plane by a common via hole. To avoid the common ground path, the ground pin of the input- and output transducer are fed to the system ground plane (bottom PCB plane) by their own via hole. The transducers' grounding pins should be isolated from the upper grounding plane.

A common GND inductivity of 0.5nH degrades the ultimate rejection (crosstalk) by 20dB.

The optimised PCB layout, including matching network for transformation to 50 Ohm, is shown here. In this PCB layout the grounding loops are minimised to realise good ultimate rejection.



Optimised PCB layout for SAW filters in QCC8B package, pinning 2,5 (top side, scale 1:1)

The bottom side is a copper plane (system ground area). The input and output grounding pins are isolated and connected to the common ground by separated via holes.

For good contact of the upper grounding area with the lower side it is necessary to place enough via holes.



SAW Components

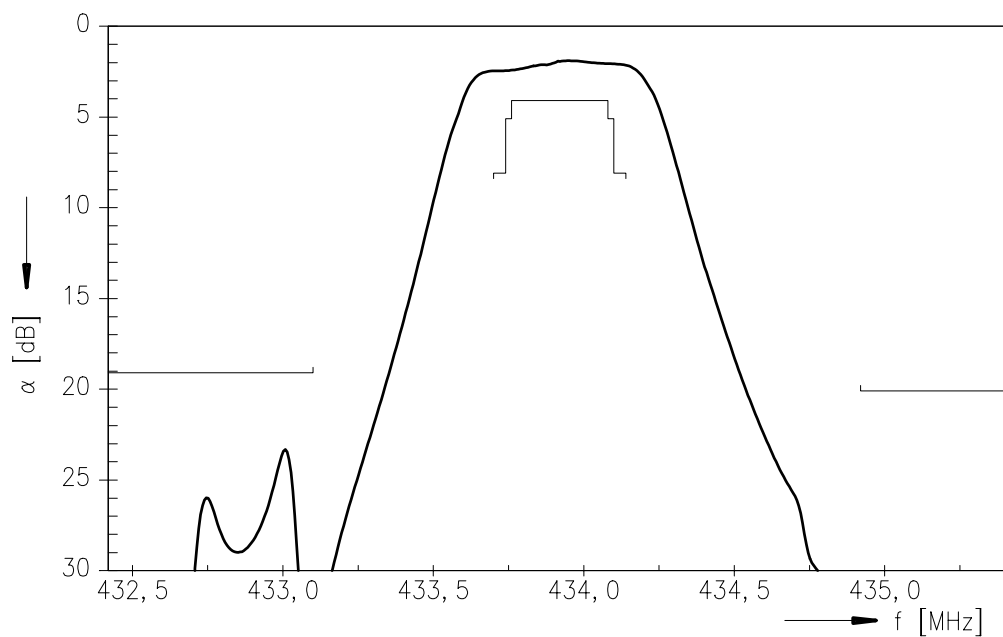
B3760

Low-loss Filter

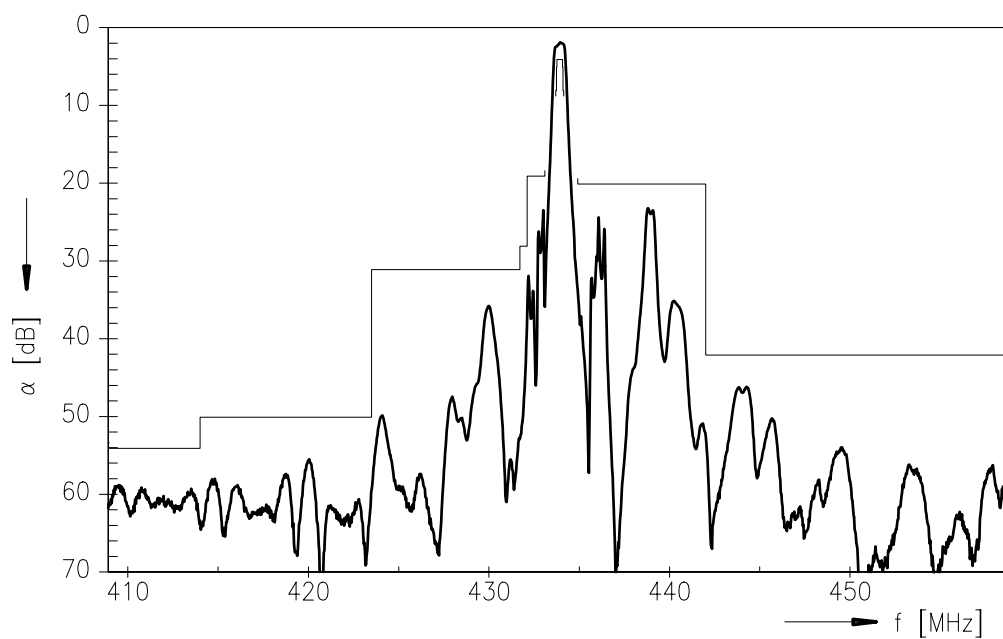
433,92 MHz

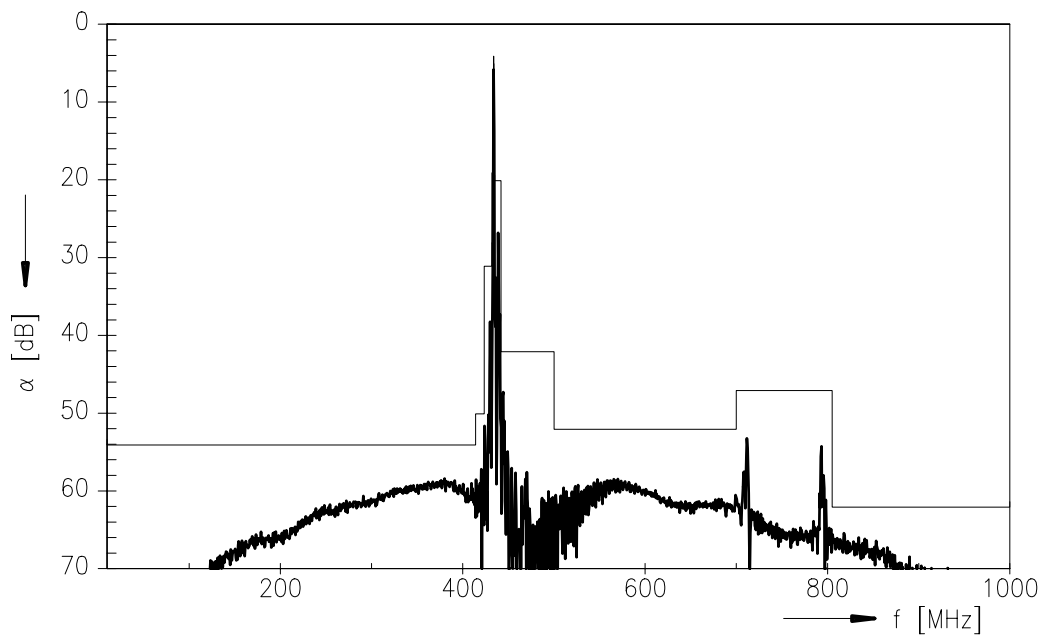
## Data Sheet

### Frequency response



### Frequency response (wideband)



**SAW Components****B3760****Low-loss Filter****433,92 MHz****Data Sheet****Frequency response (ultimate rejection)****Published by EPCOS AG****Surface Acoustic Wave Components Division, SAW CE AE PD****P.O. Box 80 17 09, D-81617 München**

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