



SAW Components

Data Sheet B3780





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B3780

Low-loss Filter

433,92 MHz

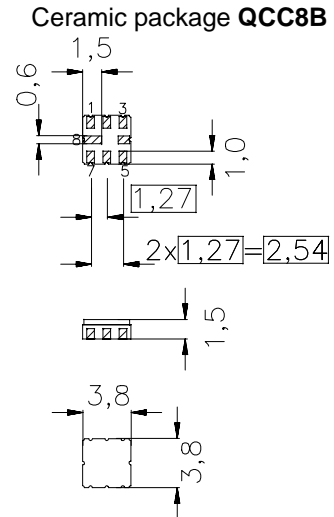
Data Sheet

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

Terminals

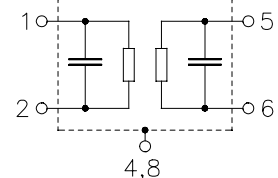
- Ni, gold plated



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

Pin configuration ¹⁾

- 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
B3780	B39431-B3780-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 Ω

¹⁾ 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: $T_A = -40 \dots +85^\circ\text{C}$
 Terminating source impedance: $Z_S = 50 \Omega$ and matching network
 Terminating load impedance: $Z_L = 50 \Omega$ and matching network

		min.	typ.	max.	
Center frequency (center frequency between 3 dB points)	f_C	—	433,92	—	MHz
Minimum insertion attenuation including loss in matching elements	α_{\min}	—	2,0	2,8	dB
excluding loss in matching elements		—	1,6	2,4	dB
Pass band (relative to α_{\min}) 433,645 ... 434,195 MHz		—	0,9	3,0	dB
Filter bandwidth $\alpha_{\text{rel}} \leq 3 \text{ dB}$		780	850	920	kHz
Relative attenuation (relative to α_{\min})	α_{rel}				
10,00 ... 414,00 MHz		48	53	—	dB
414,00 ... 425,00 MHz		42	47	—	dB
425,00 ... 431,50 MHz		28	33	—	dB
431,50 ... 433,00 MHz		18	21	—	dB
434,92 ... 443,00 MHz		14	18	—	dB
443,00 ... 530,00 MHz		36	41	—	dB
530,00 ... 670,00 MHz		55	60	—	dB
670,00 ... 830,00 MHz		45	50	—	dB
830,00 ... 1000,00 MHz		60	65	—	dB
1000,00 ... 2500,00 MHz		43	48	—	dB
Impedance for pass band matching ¹⁾					
Input: $Z_{\text{IN}} = R_{\text{IN}} \parallel C_{\text{IN}}$		—	330 \parallel 1,9	—	$\Omega \parallel \text{pF}$
Output: $Z_{\text{OUT}} = R_{\text{OUT}} \parallel C_{\text{OUT}}$		—	330 \parallel 1,9	—	$\Omega \parallel \text{pF}$

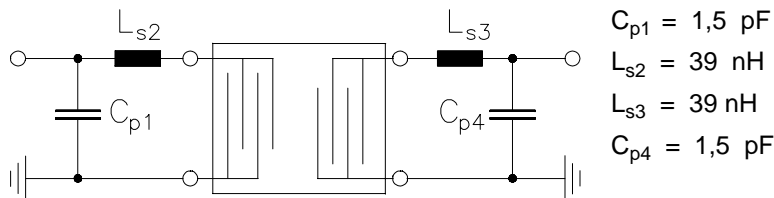
¹⁾ Power matching of the SAW filter requires a certain source and load impedance. This characteristic impedance is provided by the 50 Ohm environment and a wideband matching network at input and output. After removing the SAW filter, the conjugate complex impedance values of the input and output matching network including the 50 Ohm environment are calculated.

For more details, we refer to EPCOS application note #4.



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Matching network to 50 Ω (element values depend on pcb layout and equivalent circuit)



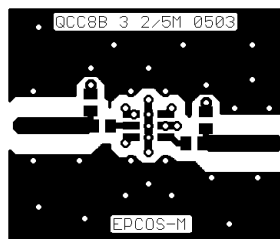
Minimising the crosstalk

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 1,5 (top side, scale 1:1)

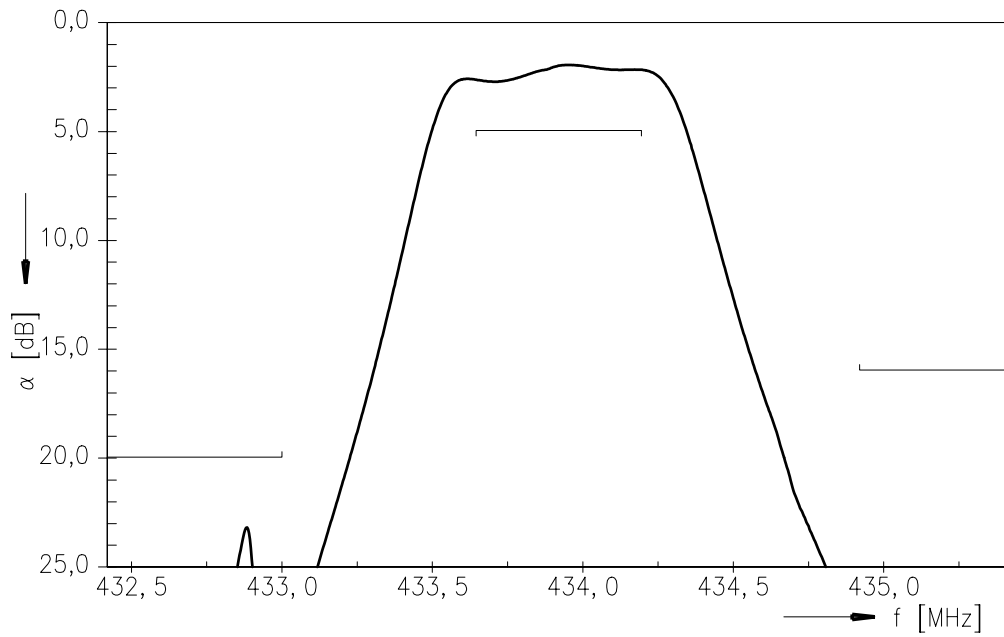
The bottom side is a copper plane (system ground area). The input and output grounding pins are isolated and connected to the common ground by separated via holes.

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

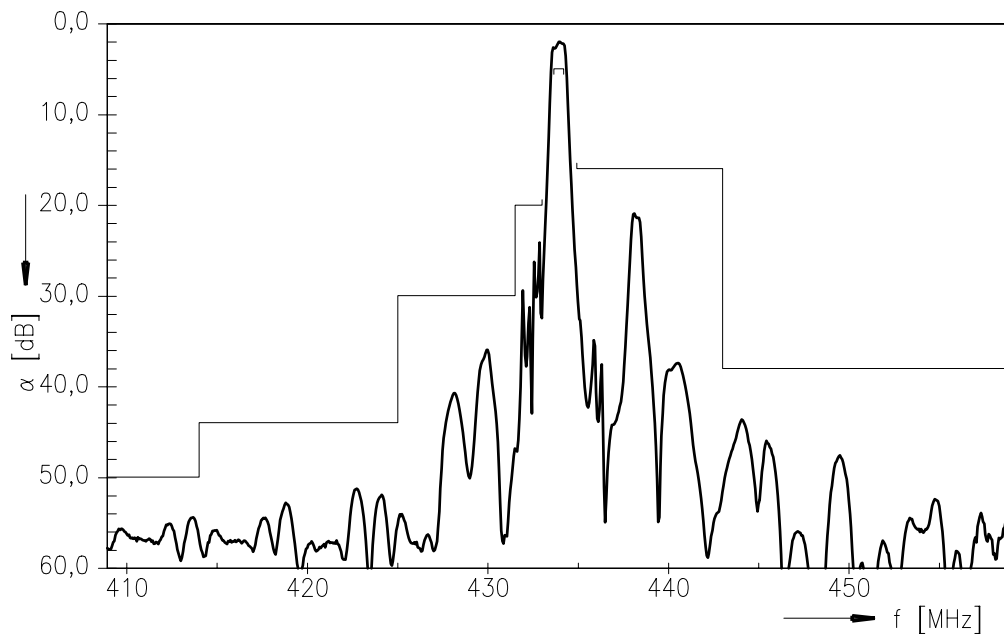


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Frequency response



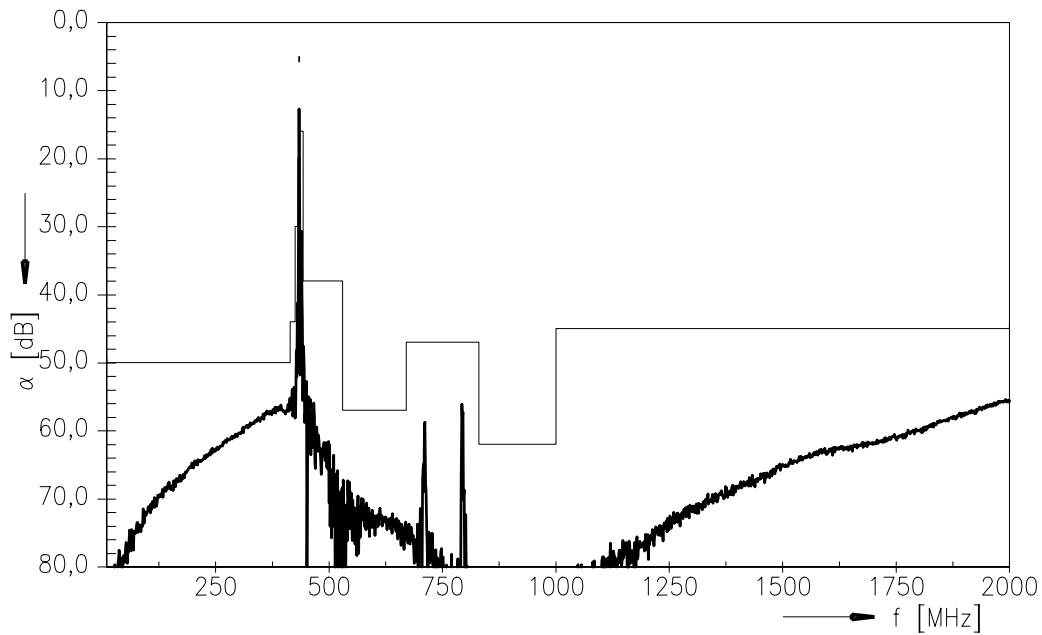
Frequency response (wideband)





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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