EPCOS

SAW Components

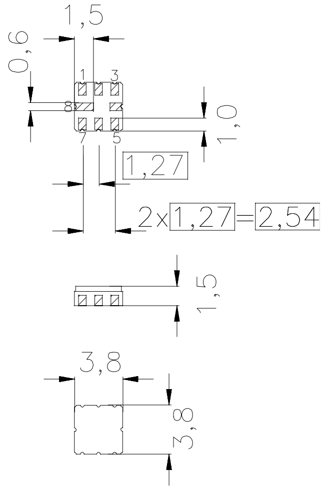
Data Sheet B3781

EPCOS

SAW Components	B3781
Low-loss Filter	**315,00 MHz**

Data Sheet

Ceramic package **QCC8B**



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

Features

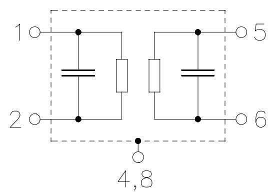
- RF low-loss filter for remote control receivers
- Package for **S**urface **M**ounted **T**echnology (**SMT**)
- Balanced and unbalanced operation possible
- Passivation layer: Elpas
- AEC-Q200 qualified component family

Terminals

- Ni, gold plated

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
B3781	B39321-B3781-Z810	C61157-A7-A46	F61074-V8167-Z000

Electrostactic **S**ensitive **D**evice (**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.

Characteristics

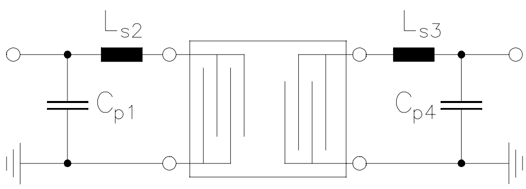
Reference temperature: T_A = –40 ... +85°C
Terminating source impedance: Z_S = 50 Ω and matching network
Terminating load impedance: Z_L = 50 Ω and matching network

		min.	typ.	max.	
Center frequency (center frequency between 3 dB points)	f_C	—	315,00	—	MHz
Minimum insertion attenuation	α_{min}				
including loss in matching elements		—	1,8	2,5	dB
excluding loss in matching elements		—	1,1	2,0	dB
Pass band (relative to α_{min})					
314,725... 315,275 MHz		—	0,9	3,0	dB
Filter bandwidth					
$\alpha_{rel} \leq 3$ dB		0,69	0,76	0,83	MHz
Relative attenuation (relative to α_{min})	α_{rel}				
10,00 ... 294,50 MHz		47	51	—	dB
294,50 ... 304,50 MHz		42	46	—	dB
304,50 ... 312,80 MHz		21	28	—	dB
312,80 ... 313,20 MHz		33	40	—	dB
313,20 ... 314,30 MHz		6	9	—	dB
316,00 ... 323,00 MHz		10	14	—	dB
323,00 ... 335,00 MHz		34	40	—	dB
335,00 ... 600,00 MHz		43	48	—	dB
600,00 ...1000,00 MHz		60	70	—	dB
1000,00 ...2500,00 MHz		43	48	—	dB
Impedance for pass band matching [1)]					
Input: $Z_{IN} = R_{IN} \parallel C_{IN}$		—	410 ‖ 2,6	—	Ω ‖ pF
Output: $Z_{OUT} = R_{OUT} \parallel C_{OUT}$		—	410 ‖ 2,6	—	Ω ‖ pF

[1)] 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.

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



C_{p1} = 1,5 pF
L_{s2} = 68 nH
L_{s3} = 68 nH
C_{p4} = 1,5 pF

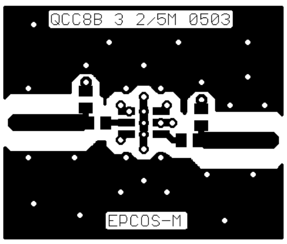
Minimising the crosstalk

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.

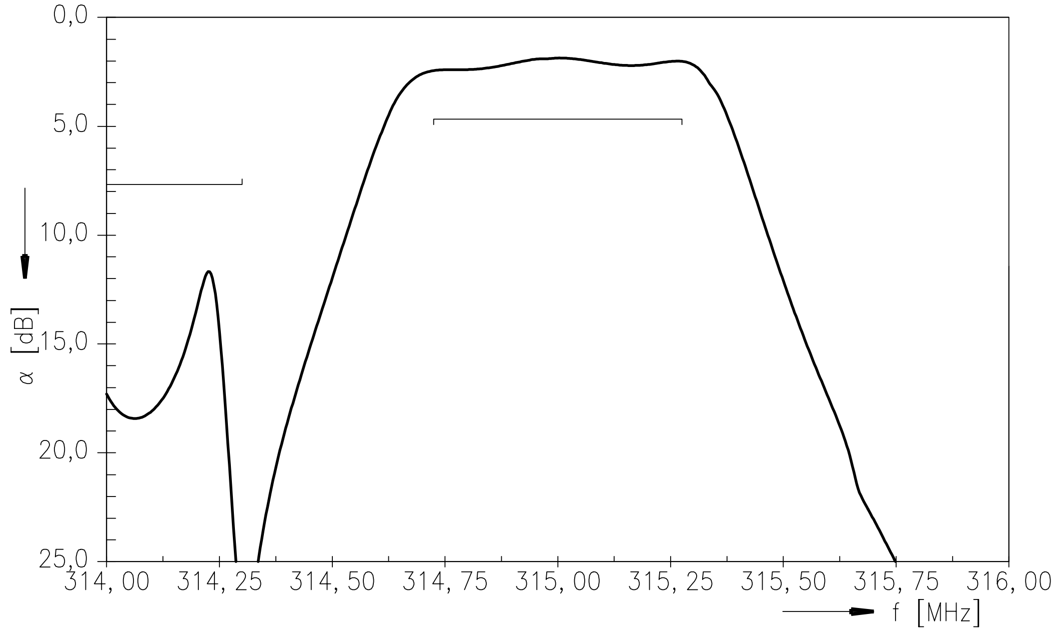


Optimised PCB layout for SAW filters in QCC8B package, pinning 2,5 (top side, scale 1:1)

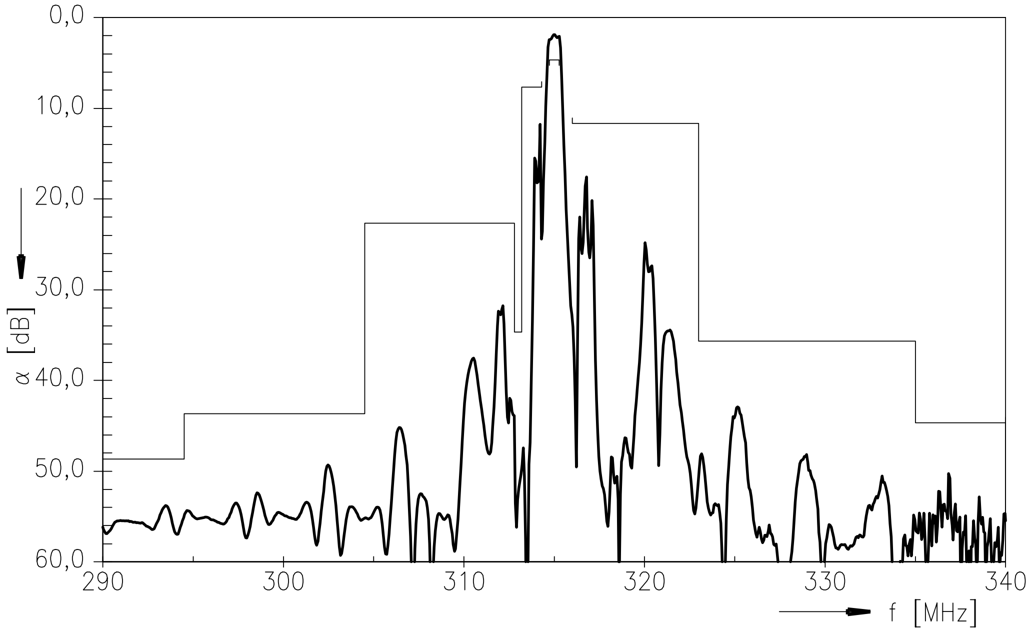
The bottom side is a copper plane (system ground area). The input and output grounding pins are isolated and connected to the common ground by separated via holes.

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

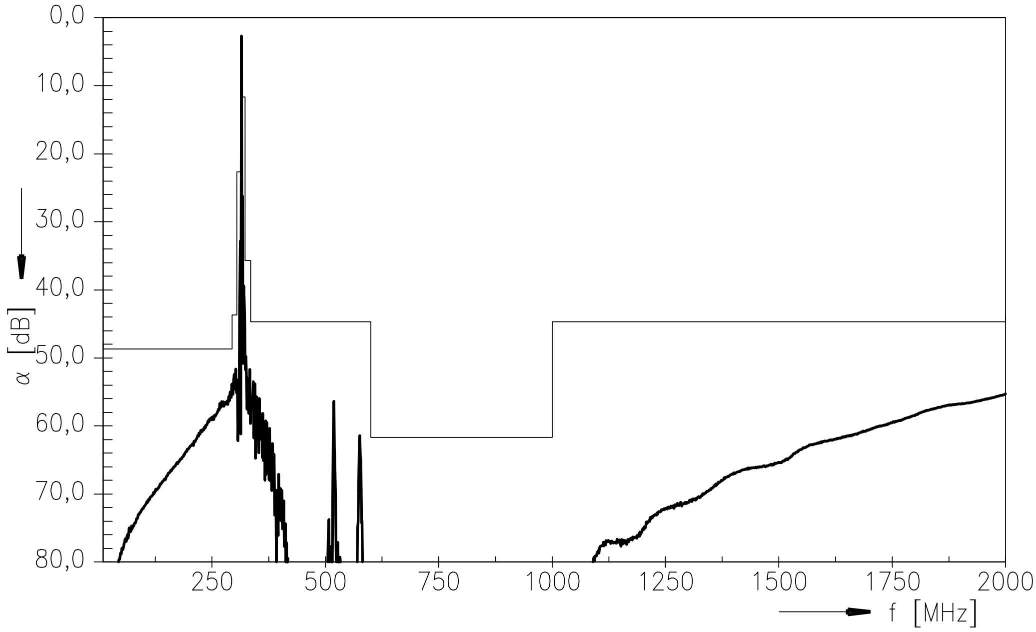
Frequency response



Frequency response (wideband)



Frequency response (ultimate rejection)



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