SAW Components

SAW IF filter

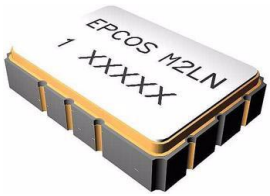
Satellite radio

Series/type: **B1709**
Ordering code: **B39805B1709H310**

Date: May 16, 2006
Version: 1.1

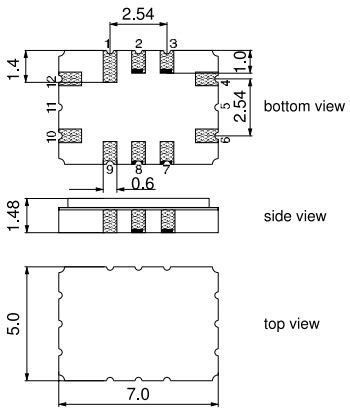
Application

- IF filter for digital radio
- Usable bandwidth 3.7 MHz
- Low insertion attenuation
- Constant group delay
- Unbalanced or balanced operation



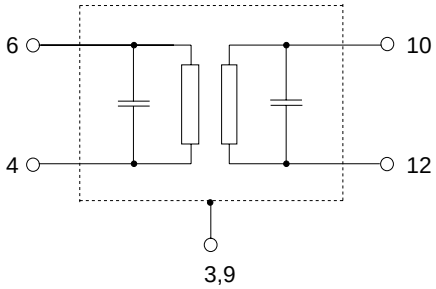
Features

- Package size 7.0 x 5.0 x 1.48 mm³
- Package code QCC12C
- RoHS compatible
- Approximate weight 0.20 g
- Ceramic package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

■	4	Balanced input or input ground
■	6	Input
■	10	Balanced output or output ground
■	12	Output
■	3,9	Case – ground
■	1,2,7,8	To be grounded



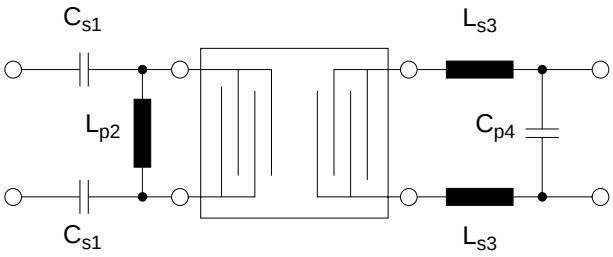
Characteristics

Temperature range for specification: T = –40 ˚C to (+85 ˚C) +105 ˚C
Terminating source impedance: Z_S = 27 Ω and matching network
Terminating load impedance: Z_L = 1 kΩ and matching network

		min.	typ. @ 25 ˚C	max.	
Nominal frequency	f_N	—	80.46	—	MHz
Minimum insertion attenuation[1]	α_{min}	—	18.1	19.6	dB
Maximum voltage gain source – load (V_L/V_S)	α_{vgsl}	–8.8	–7.3	—	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
$f_N \pm 1.84$ MHz		—	0.9	(1.3) 1.8	dB
Pass bandwidth					
$\alpha_{rel} \leq 1.5$ dB	$B_{1.5dB}$	—	4.3	—	MHz
$\alpha_{rel} \leq 3$ dB	B_{3dB}	—	4.6	—	MHz
$\alpha_{rel} \leq 15$ dB	B_{15dB}	—	5.5	6.0	MHz
$\alpha_{rel} \leq 30$ dB	B_{30dB}	—	6.1	6.5	MHz
Mean attenuation (relative to α_{min})	α_{rel}				
Upper sidelobe 86.47 ... 91.53 MHz		50.0	54.0	—	dB
Relative attenuation (relative to α_{min})	α_{rel}				
Lower sidelobe 55.00 ... 67.00 MHz		48.0	54.0	—	dB
67.00 ... 75.99 MHz		39.0	43.0	—	dB
Upper sidelobe 85.21 ... 86.47 MHz		40.0	49.0	—	dB
86.47 ... 91.53 MHz		45.0	49.0	—	dB
91.53 ... 95.21 MHz		46.0	52.0	—	dB
95.21 ... 105.00 MHz		46.0	52.0	—	dB
Group delay ripple (p–p)	$\Delta\tau$				
Aperture 50 kHz $f_N \pm 1.84$ MHz		—	190	—	ns
Temperature coefficient of frequency	TC_f	—	–18	—	ppm/K

[1] Including losses in the matching network

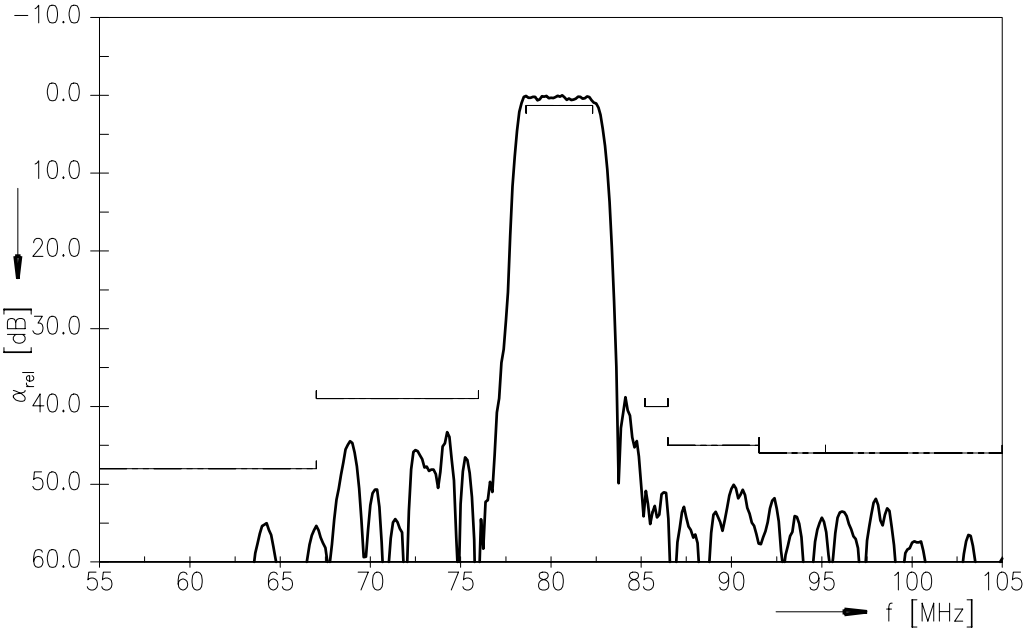
Matching network[1] ((based on four port measurement, quality factors Q_L = 40, Q_C = 90)



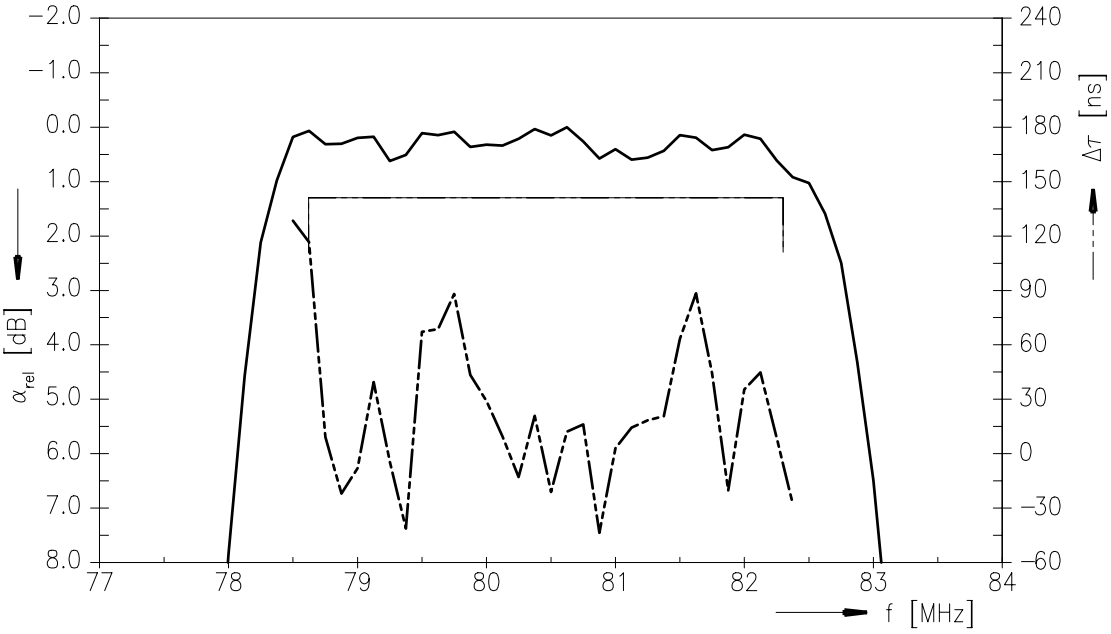
C_{s1} = 7.5 pF
L_{p2} = 240 nH
L_{s3} = 200 nH
C_{p4} = 15 pF

1) The input matching circuit has been designed as a power match of the filter's input port to 175 Ω. In a second step it has been optimized in a narrow range in order to operate at 27 Ω with optimum filter performance.

Transfer function



Transfer function (pass band)



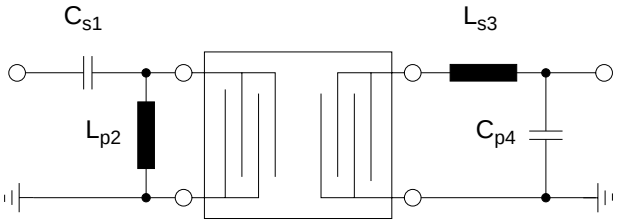
Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω (single ended) and matching network
Terminating load impedance: Z_L = 50 Ω (single ended) and matching network

		min.	typ. @ 25 ˚C	max.	
Nominal frequency	f_N	—	80.46	—	MHz
Minimum insertion attenuation[1)]	α_{min}	—	15.3	16.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
$f_N \pm 1.84$ MHz		—	1.1	1.5	dB
Pass bandwidth					
$\alpha_{rel} \leq 1.5$ dB	$B_{1.5dB}$	—	4.3	—	MHz
$\alpha_{rel} \leq 3$ dB	B_{3dB}	—	4.6	—	MHz
$\alpha_{rel} \leq 15$ dB	B_{15dB}	—	5.5	6.0	MHz
$\alpha_{rel} \leq 30$ dB	B_{30dB}	—	6.2	6.6	MHz
Mean attenuation (relative to α_{min})	α_{rel}				
Upper sidelobe 86.47 ... 91.53 MHz		46.0	48.0	—	dB
Relative attenuation (relative to α_{min})	α_{rel}				
Lower sidelobe 55.00 ... 67.00 MHz		44.0	48.0	—	dB
67.00 ... 75.99 MHz		34.0	37.0	—	dB
Upper sidelobe 85.21 ... 86.47 MHz		37.0	42.0	—	dB
86.47 ... 91.53 MHz		40.0	44.0	—	dB
91.53 ... 95.21 MHz		44.0	47.0	—	dB
95.21 ... 105.00 MHz		45.0	48.0	—	dB
Group delay ripple (p–p)	$\Delta\tau$				
Aperture 50 kHz $f_N \pm 1.84$ MHz		—	180	—	ns
Temperature coefficient of frequency	TC_f	—	–18	—	ppm/K

1) Including losses in the matching network

Matching network (based on four port measurement, quality factors Q_L = 40, Q_C = 90)

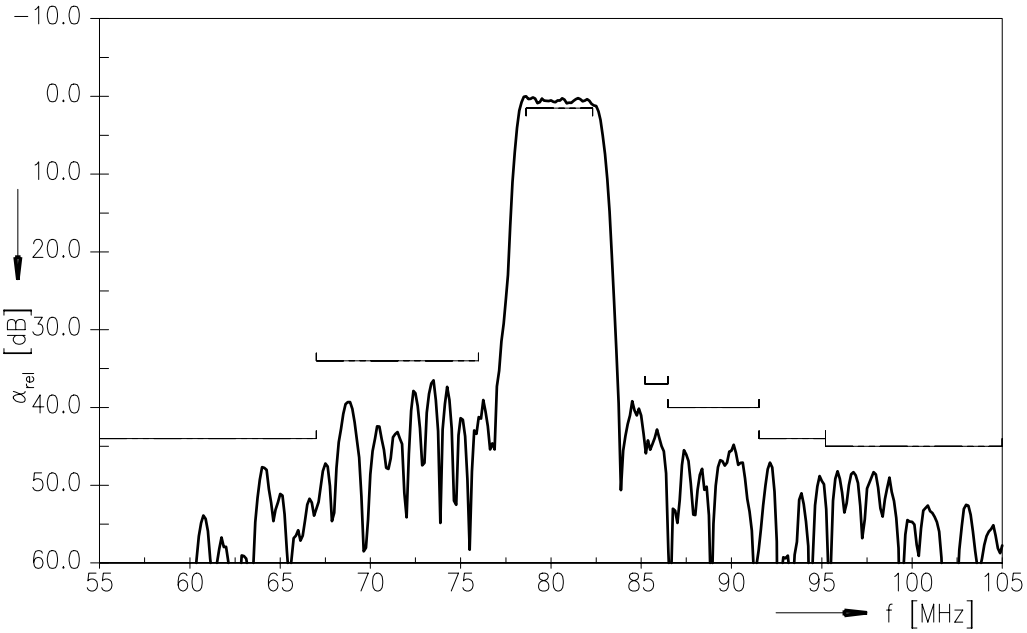


C_{s1} = 3.9 pF
L_{p2} = 220 nH
L_{s3} = 200 nH
C_{p4} = 56 pF

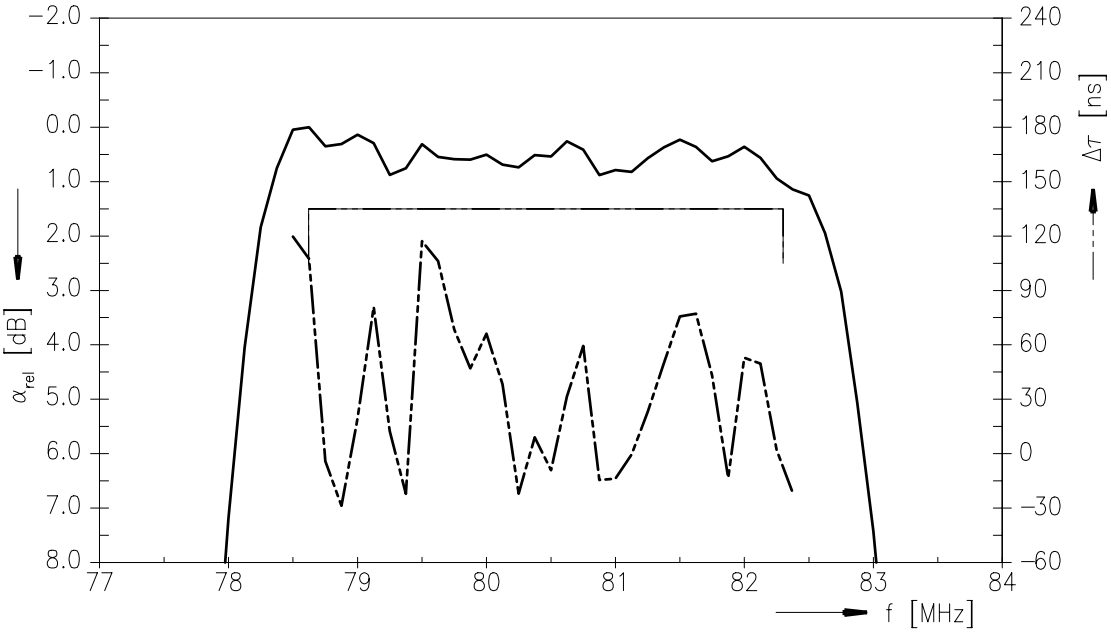
Maximum ratings

Operable temperature range	T	–40 / +105	˚C	
Storage temperature range	T_{stg}	–40 / +105	˚C	
DC voltage	V_{DC}	0	V	
Source power	P_S	10	dBm	source impedance 50 Ω

Transfer function



Transfer function (pass band)



References

Type	B1709
Ordering code	B39805B1709H310
Marking and package	C61157-A7-A95
Packaging	F61074-V8170-Z000
Date codes	L_1126
S-parameters	B1709_NB_UN.s4p
Soldering profile	S_6001
RoHS compatible	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."

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