# SAW Components

## SAW IF Filter
## WiMAX

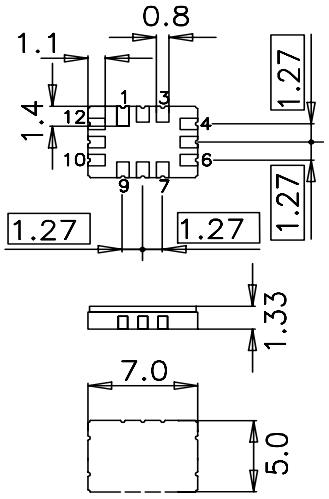
| | |
|---|---|
| **Series/Type:** | **B5011** |
| **Ordering code:** | **B39461-B5011-H810** |
| Date: | Jun 09, 2008 |
| Version: | 2.0 |

## Application

- Low-loss IF filter for WiMAX
- Usable bandwidth 3.7 MHz
- Ceramic SMD package

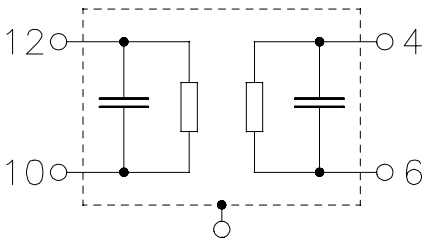

## Features

- Package size 7.0 x 5.0 x 1.33 mm³
- Package code QCC12E
- RoHS compatible
- Approx. weight 0.2 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals




## Pin configuration

| | | |
|---|---|---|
| ■ | 10 | Input |
| ■ | 12 | Input ground or balanced input |
| ■ | 4 | Output |
| ■ | 6 | Output ground or balanced output |
| ■ | 2, 3, 8, 9 | Ground |
| ■ | 1, 5, 7, 11 | Case ground |



## Characteristics

Operating temperature range: T = –40 ˚C to +85 ˚C
Terminating source impedance: $Z_S$ = 200 Ω balanced and matching network
Terminating load impedance: $Z_L$ = 200 Ω balanced and matching network

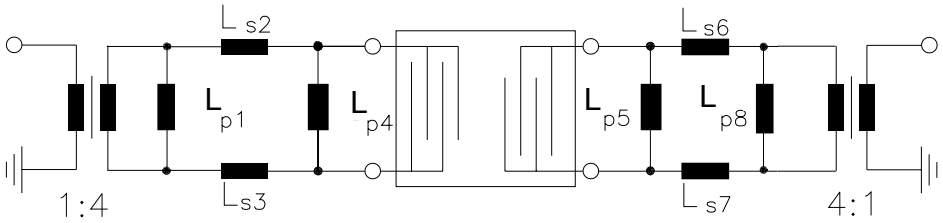
| | | min. | typ. | max. | |
|---|---|---|---|---|---|
| **Nominal frequency** | $f_N$ | — | 456.00 | — | MHz |
| **Minimum insertion attenuation**[1] (including matching network) | $\alpha_{min}$ | — | 8.5 | 10.0 | dB |
| **Amplitude ripple** (p-p) | $\Delta\alpha$ | | | | |
| $f_N \pm 1.7$ MHz | | — | 0.6 | 1.0 | dB |
| $f_N \pm 1.85$ MHz | | — | 1.5 | 3.0 | dB |
| **Absolute group delay** (at $f_N$) | $\tau$ | — | 0.55 | 3.0 | µs |
| **Group delay ripple** (p-p) | $\Delta\tau$ | | | | |
| $f_N \pm 1.7$ MHz | | — | 120 | 250 | ns |
| **Return loss** $f_N \pm 1.7$ MHz Input | | 8 | 12 | — | dB |
| Output | | 10 | 14 | — | dB |
| **Impulse response attenuation** (Time/Height values are relative to the main time response lobe) | | | | | |
| 1-2 µs | | 20 | 30 | — | dB |
| 2-3 µs | | 35 | 38 | — | dB |
| > 3 µs | | 45 | 49 | — | dB |
| **Relative attenuation** (relative to $\alpha_{min}$) | $\alpha_{rel}$ | | | | |
| 1 MHz ... 256 MHz | | 30 | 70 | — | dB |
| 256 MHz ... 360 MHz | | 40 | 70 | — | dB |
| 360 MHz ... 416.0 MHz | | 50 | 64 | — | dB |
| 416 MHz ... 452.65 MHz | | 40 | 46 | — | dB |
| 459.35 MHz ... 656 MHz | | 40 | 44 | — | dB |
| 656 MHz ... 946 MHz | | 30 | 44 | — | dB |
| **Temperature coefficient of frequency**[2] | $TC_f$ | — | –0.036 | — | ppm/K² |
| **Turnover temperature** | $T_0$ | — | 20 | — | ˚C |

1) Could increase up to 10,8 dB with single ended matching network at 50 Ω
2) Temperature dependance of $f_c$: $f_c(T_A) = f_c(T_0)(1 + TC_f(T_A - T_0)^2)$

**Matching network to 200 Ω balanced**

4:1 transformers are only required for measurement in a 50 Ω environment

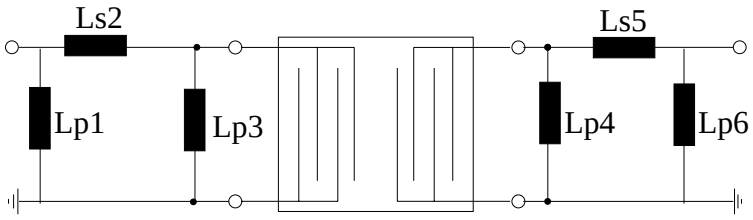
(element values depend on PCB layout)




$L_{p1}$ = 100 nH $L_{p4}$ = 22 nH $L_{s6}$ = $L_{s7}$= 18 nH

$L_{s2}$ = $L_{s3}$= 33 nH $L_{p5}$= 27 nH $L_{p8}$ = 62 nH

**Matching network to 50 Ω single ended**(element values depend on PCB layout)



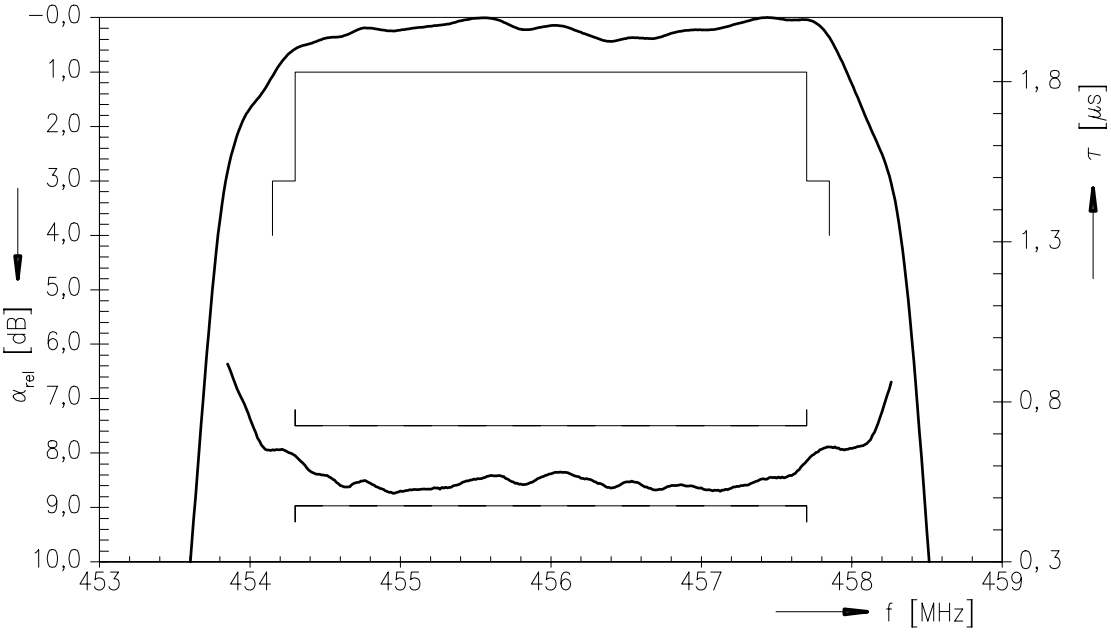

$L_{p1}$ not used**;** $L_{s2}$ = 47nH; $L_{p3}$ = 18 nH $L_{p4}$ = 22nH; $L_{s5}$=47nH; $L_{p6}$=47nH

**Maximum ratings**

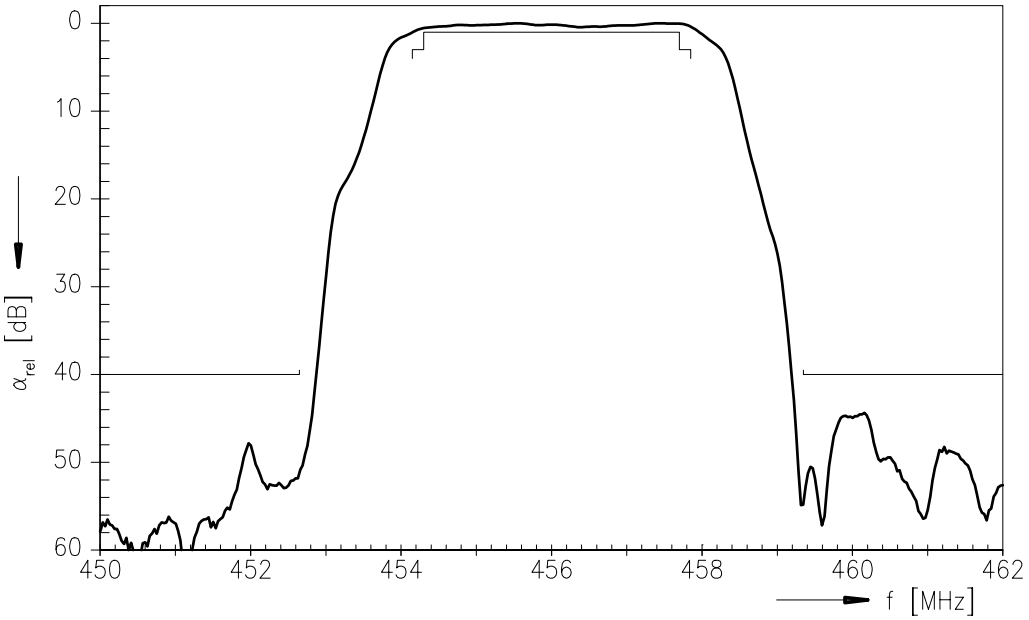
| | | | | |
|---|---|---|---|---|
| Operable temperature range | T | –40/+80 | °C | |
| Storage temperature range | $T_{stg}$ | –40/+85 | °C | |
| DC voltage | $V_{DC}$ | 5 | V | between input, output and ground |
| DC voltage | $V_{DC}$ | 0 | V | between 10, 12 and between 4,6 |
| ESD voltage | $V_{ESD}$ | 200[1)] | V | machine model, 1 pulse |
| Input power | $P_{IN}$ | 10 | dBm | |

1) acc. to J-STD22A-0115A (machine model, 1 pulse +/-).

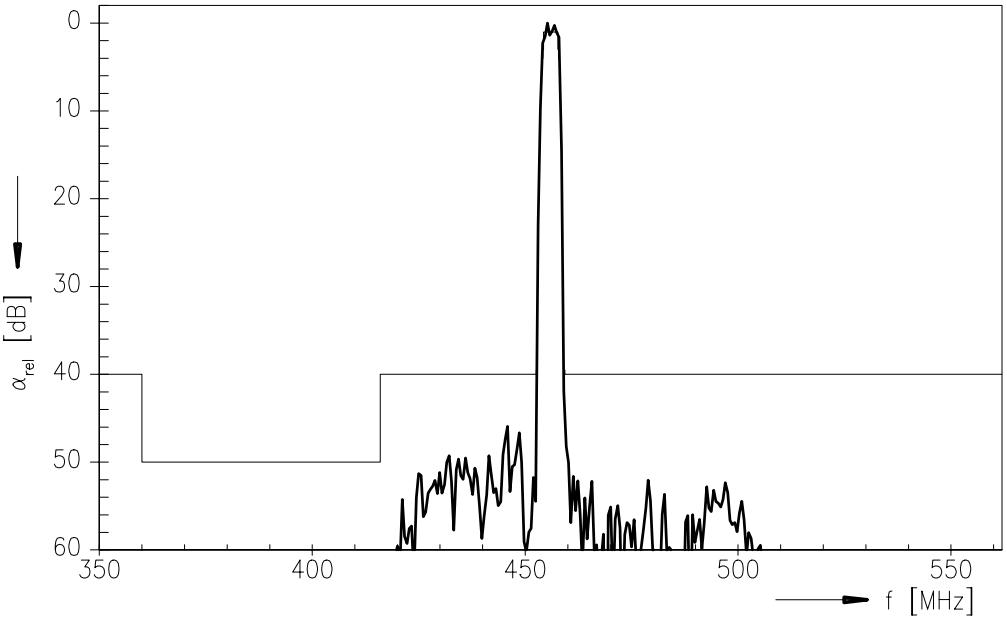
**Transfer function**



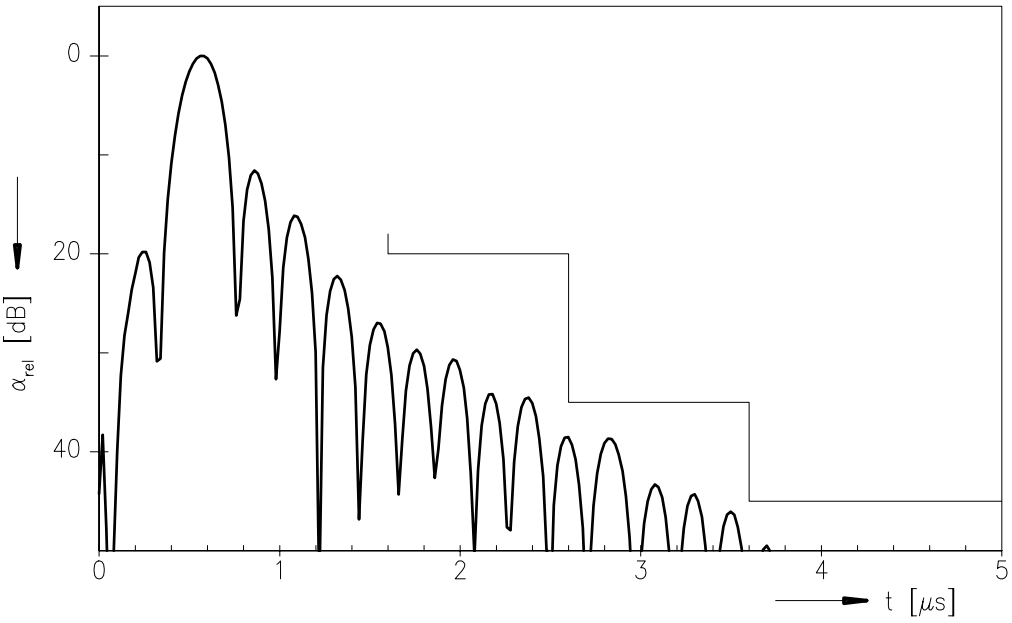

**Transfer function** (wideband



**Normalized transfer function**




**Transfer function (Impulse response)**



| | | |
|---|---|---|
| **Type** | B5011 | |
| **Ordering code** | B39461-B5011-H810 | |
| **Marking and Package** | C61157-A7-A103 | |
| **Packaging** | F61074-V8170-Z000 | |
| **Date Codes** | | |
| **S-Parameters** | | |
| **Soldering profile** | S_6001 | |

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**Published by EPCOS AG**
**Surface Acoustic Wave Components Division**
**P.O. Box 80 17 09, 81617 Munich, GERMANY**



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