



SAW Components

SAW Filter

GSM/EDGE

Series/Type:	B5011
Ordering code:	B39461-B5011-H810
Date:	Nov 28, 2005
Version:	4



SAW Components

B5011

Low-Loss Filter for WiMAX

456.00 MHz

Data Sheet



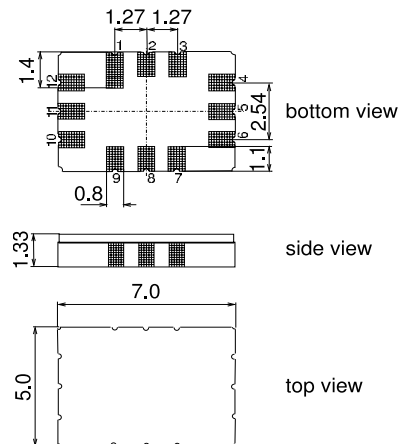
Application

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



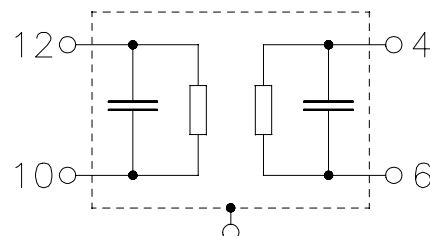
Features

- Package size 7.0 x 5.0 x 1.33 mm³
- Package code QCC12E
- RoHS compatible
- Approx. weight 0.2 g
- Package for Surface Mount Technology (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





SAW Components

B5011

Low-Loss Filter for WiMAX

456.00 MHz

Data Sheet



Characteristics

Operating temperature range:

$T = -40\text{ °C to }+85\text{ °C}$

Terminating source impedance:

$Z_S = 200\ \Omega$ balanced and matching network

Terminating load impedance:

$Z_L = 200\ \Omega$ balanced and matching network

		min.	typ.	max.	
Nominal frequency	f_N	—	456.00	—	MHz
Minimum insertion attenuation¹⁾ (including matching network)	$\alpha_{\min}$	—	8.5	10.0	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
	$f_N \pm 1.7\text{ MHz}$	—	0.6	1.0	dB
	$f_N \pm 1.85\text{ MHz}$	—	1.5	3.0	dB
Absolute group delay (at f_N)	τ	—	0.55	3.0	μs
Group delay ripple (p-p)	$\Delta\tau$				
	$f_N \pm 1.7\text{ MHz}$	—	120	250	ns
Return loss	$f_N \pm 1.7\text{ MHz}$				
	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 $\alpha_{\min}$)	α_{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 frequency²⁾	TC_f	—	-0.036	—	ppm/K ²
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 : $f_c(T_A) = f_c(T_0)(1 + TC_f(T_A - T_0)^2)$



SAW Components

B5011

Low-Loss Filter for WiMAX

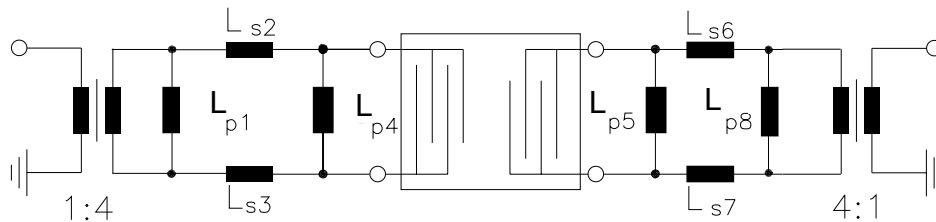
456.00 MHz

Data Sheet



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)



$$L_{p1} = 100 \text{ nH}$$

$$L_{p4} = 22 \text{ nH}$$

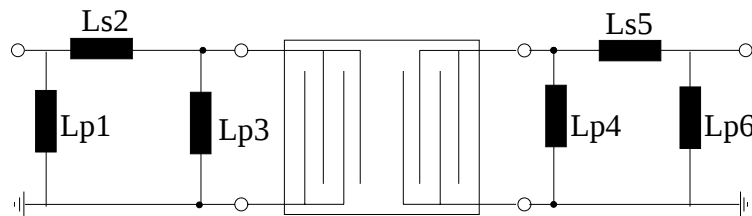
$$L_{s6} = L_{s7} = 18 \text{ nH}$$

$$L_{s2} = L_{s3} = 33 \text{ nH}$$

$$L_{p5} = 27 \text{ nH}$$

$$L_{p8} = 62 \text{ nH}$$

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



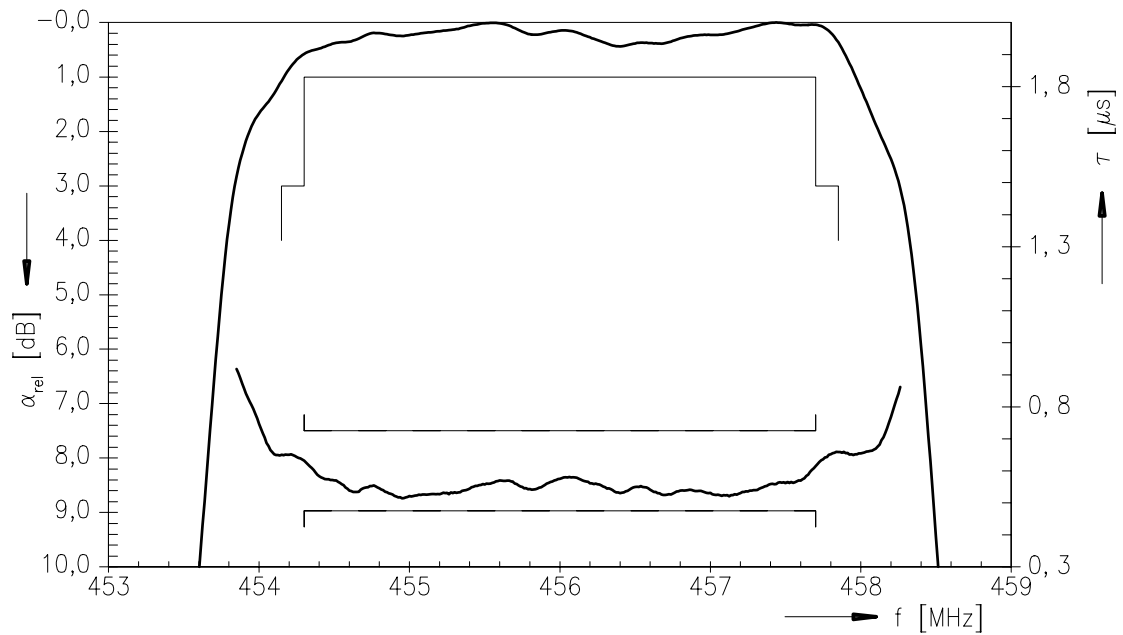
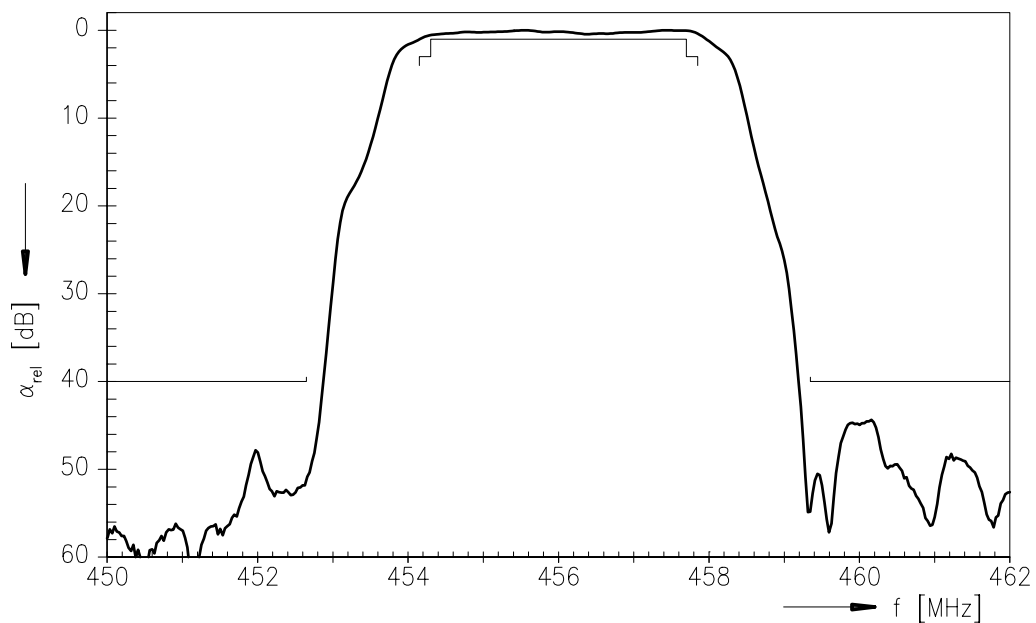
$$L_{p1} \text{ not used; } L_{s2} = 47 \text{ nH; } L_{p3} = 18 \text{ nH}$$

$$L_{p4} = 22 \text{ nH; } L_{s5} = 47 \text{ nH; } L_{p6} = 47 \text{ nH}$$

Maximum ratings

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

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

**SAW Components****B5011****Low-Loss Filter for WiMAX****456.00 MHz****Data Sheet****Transfer function****Transfer function (wideband)**

Please read *cautions and warnings* and *important notes* at the end of this document.



SAW Components

B5011

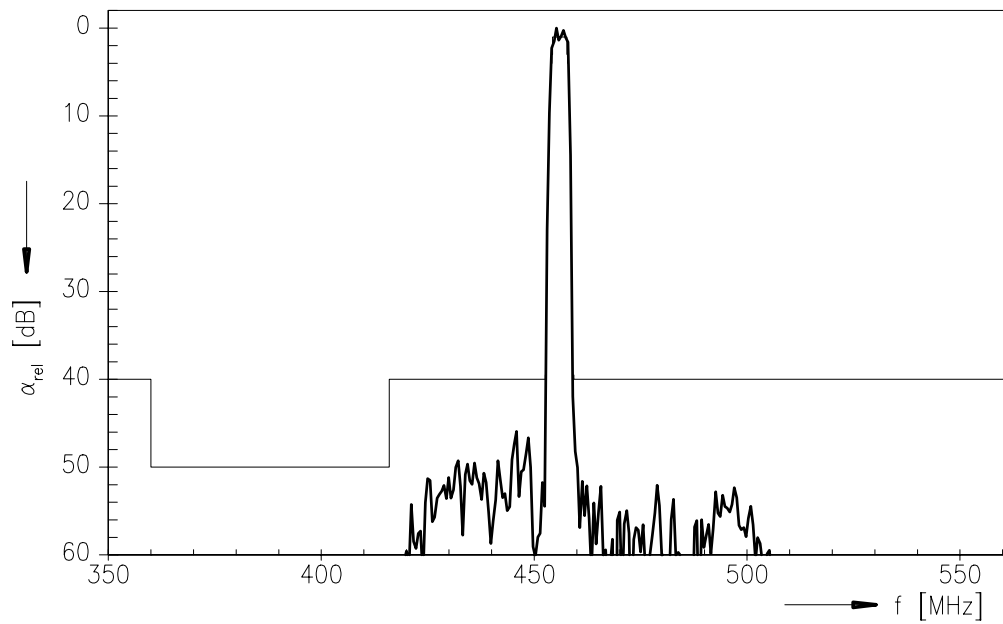
Low-Loss Filter for WiMAX

456.00 MHz

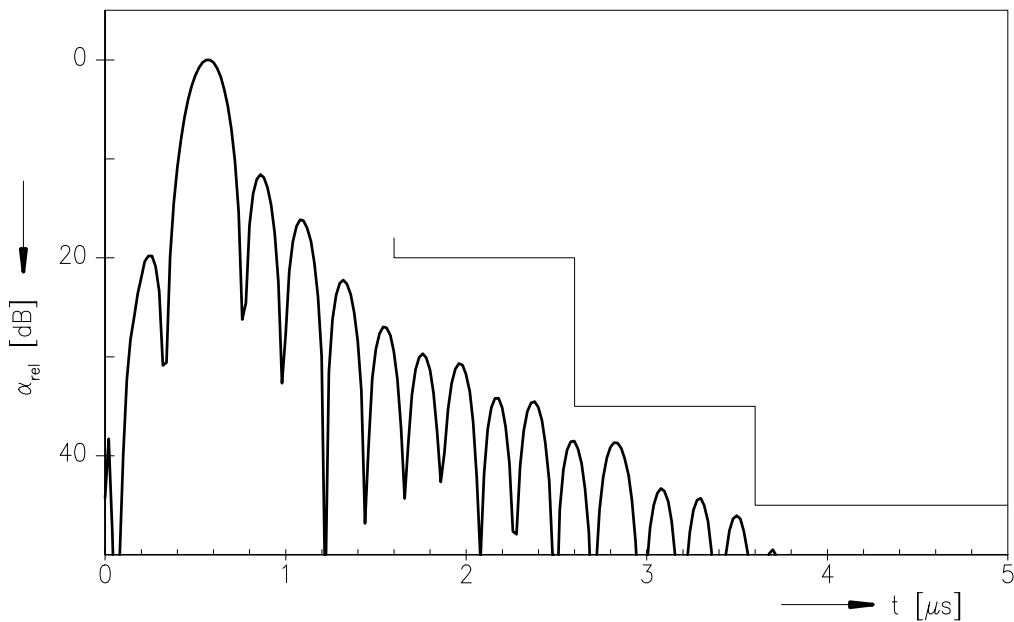
Data Sheet



Normalized transfer function



Transfer function (Impulse response)



**SAW Components****B5011****Low-Loss Filter for WiMAX****456.00 MHz****Data Sheet**

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	

For further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com .

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

© EPCOS AG 2005. Reproduction, publication and dissemination of this brochure and the information contained therein without EPCOS' prior express consent is prohibited.

Purchase orders are subject to the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry recommended by the ZVEI (German Electrical and Electronic Manufacturers' Association), unless otherwise agreed.

This brochure replaces the previous edition.

For questions on technology, prices and delivery please contact the Sales Offices of EPCOS AG or the international Representatives.

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our Sales Offices.

Please read *cautions and warnings and important notes* at the end of this document.



Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. The warnings, cautions and product-specific notes must be observed.
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as "hazardous")**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade names EPCOS, CeraDiode, CSSP, PhaseCap, PhaseMod, SIFI, SIKOREL, SilverCap, SIMID, SIOV, SIP5D, SIP5K, TOPCap, UltraCap, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.