



SAW Components

SAW Rx Filter

WCDMA Band I

Series/Type:	B9411
Ordering code:	B39212B9411K610
Date:	November 27, 2008
Version:	2.2



SAW Components

B9411

Low-Loss Filter for Mobile Communication

2140.0 MHz

Data Sheet



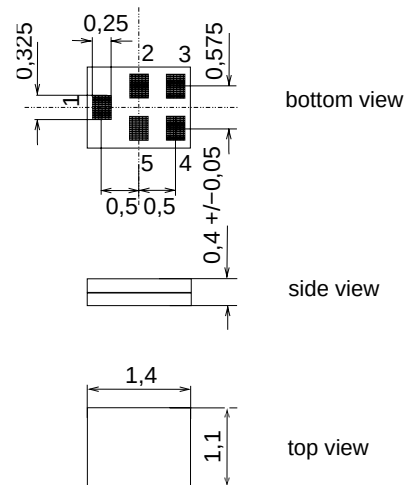
Application

- Low-loss RF filter for mobile telephone WCDMA systems, receive path (RX)
- Impedance transform from 50 Ω to 100 Ω
- Unbalanced to balanced operation
- Very low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz



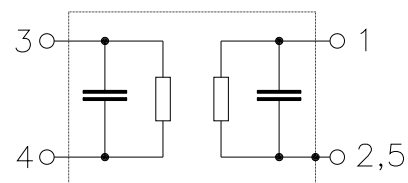
Features

- Package size 1.4 x 1.1 x 0.4 mm³
- Package code QCS5U
- RoHS compliant
- Approx. weight 0.003 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals



Pin configuration

- 1 Input, unbalanced
- 3,4 Output balanced
- 2,5 To be grounded





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Characteristics

Operating temperature range: $T = -15\text{ °C to }+80\text{ °C}$
Terminating source impedance: $Z_S = 50\ \Omega$
Terminating load impedance: $Z_L = 100\ \Omega \parallel 20\text{ nH (balanced)}$

						B9411				
						min.	typ. @ 25 °C	max.		
Center frequency						f _C	—	2140.0	—	MHz
Maximum insertion attenuation										
2110.0 ... 2170.0 MHz						α _{max}	—	1.7	2.1	dB
@f _{Carrier} 2112.4 ... 2167.6 MHz						α _{WCDMA} ¹⁾	—	1.6	2.1	dB
Amplitude ripple (p-p)										
2110.0 ... 2170.0 MHz						Δα	—	0.5	1.0	dB
2110.0 ... 2170.0 MHz						Δα _{5MHz} ²⁾	—	0.3	0.8	dB
Group delay ripple										
2110.0 ... 2170.0 MHz						Δτ _{5MHz} ²⁾	—	4.0	15.0	ns
Error Vector Magnitude										
@f _{Carrier} 2112.4 ... 2167.6 MHz						EVM ³⁾	—	0.9	2.0	%
Input VSWR										
2110.0 ... 2170.0 MHz							—	1.6	2.1	
Output VSWR										
2110.0 ... 2170.0 MHz							—	1.7	2.1	
Output amplitude balance (S ₃₁ /S ₂₁)										
2110.0 ... 2170.0 MHz							−1.0	−0.7/0.7	1.0	dB
Output phase balance (ϕ(S ₃₁) − ϕ(S ₂₁)+180°)										
2110.0 ... 2170.0 MHz							−10	−3/+2	10	°
Attenuation										
0.0 ... 1730.0 MHz							35	43	—	dB
1730.0 ... 1790.0 MHz							38	43	—	dB
1920.0 ... 1980.0 MHz							43	49	—	dB
1980.0 ... 2025.0 MHz							32	39	—	dB
2025.0 ... 2050.0 MHz							20	26	—	dB
2050.0 ... 2085.0 MHz							2	7	—	dB
2250.0 ... 2400.0 MHz							20	25	—	dB
@f _{Carrier} 2252.4 ... 2397.6 MHz						α _{WCDMA} ¹⁾	21	26	—	dB
2400.0 ... 2500.0 MHz							25	35	—	dB
2500.0 ... 3000.0 MHz							20	35	—	dB
3000.0 ... 4030.0 MHz							22	53	—	dB
4030.0 ... 4150.0 MHz							25	53	—	dB
4150.0 ... 5950.0 MHz							20	48	—	dB
5950.0 ... 6000.0 MHz							30	51	—	dB



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- 1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation below.
- 2) Ripple determined within any 5MHz channel.
- 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Annotation for characteristics section

- (2) Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

$$\int_{-\infty}^{\infty} |S_{\text{ds21}}(f) H_{\text{RRC}}(f - f_{\text{Carrier}})|^2 df$$

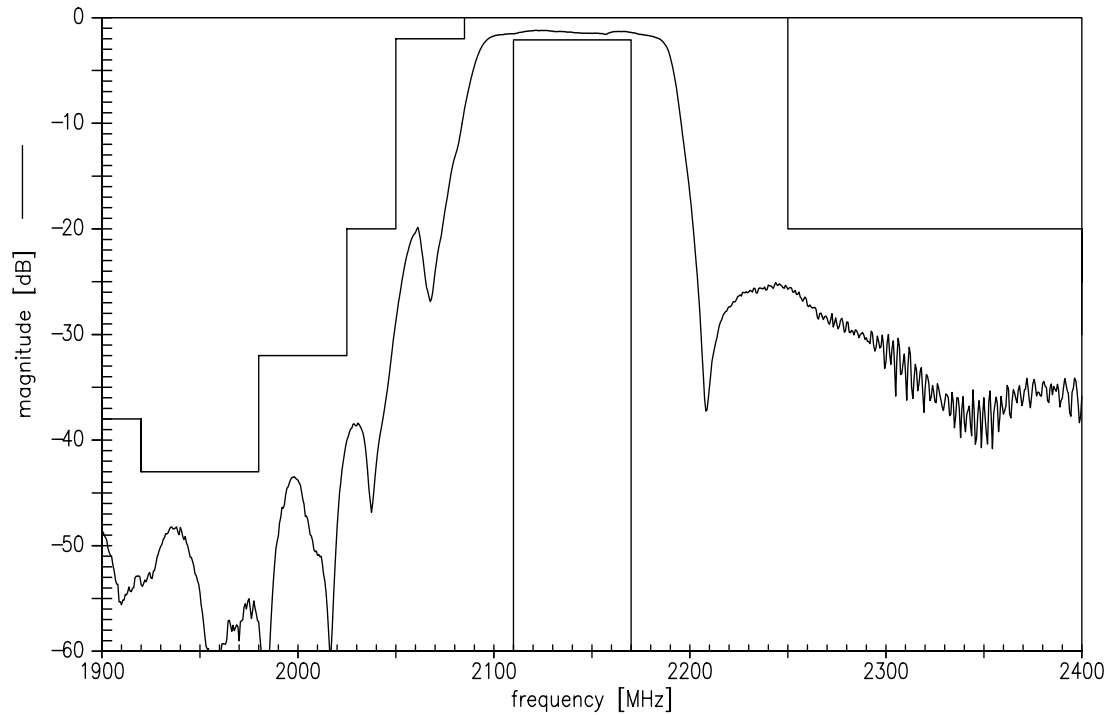
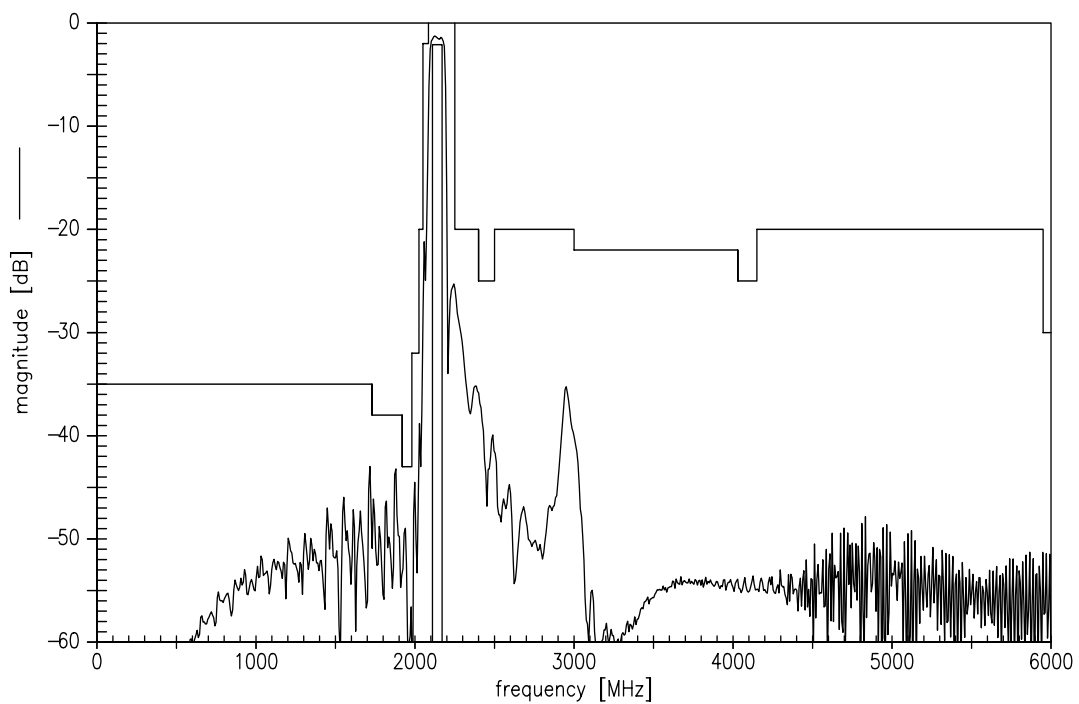
f_{Carrier} according to 3GPP TS 25.101 (e.g. for UMTS-Passband, f_{Carrier} ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 MHz (highest Rx channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{-\infty}^{\infty} |H_{\text{RRC}}(f)|^2 df = 1$$

Maximum ratings

Operable temperature range	T	-30/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	machine model, 10 pulses
Source Power	P _S	5	dBm	cw signal

- ¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

**SAW Components****B9411****Low-Loss Filter for Mobile Communication****2140.0 MHz****Data Sheet****Transfer function****Transfer function (Wideband)**

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



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Low-Loss Filter for Mobile Communication

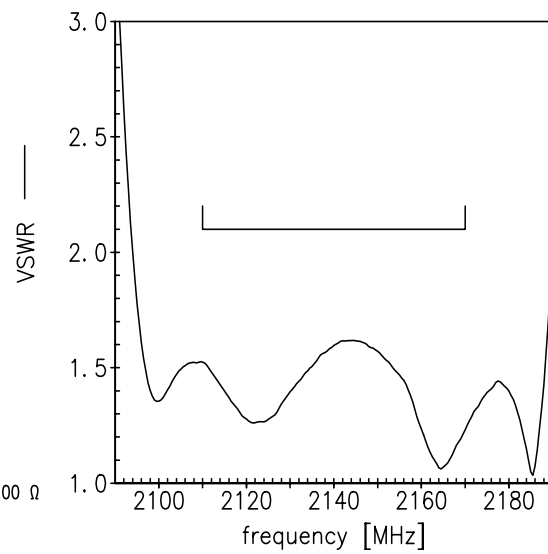
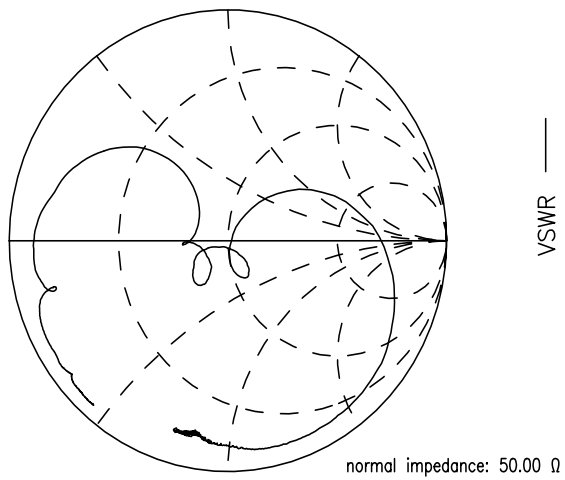
2140.0 MHz

Data Sheet

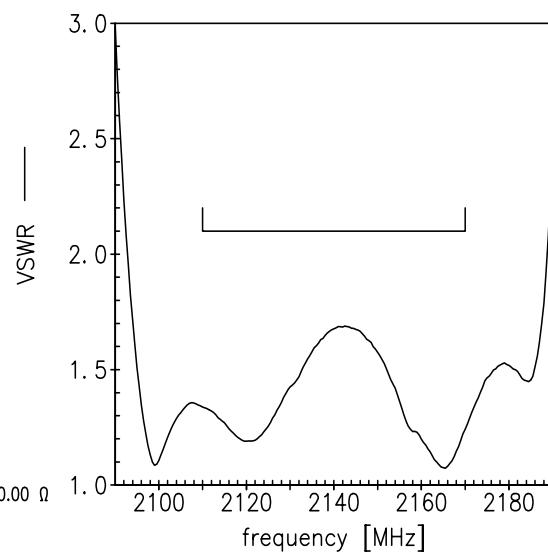
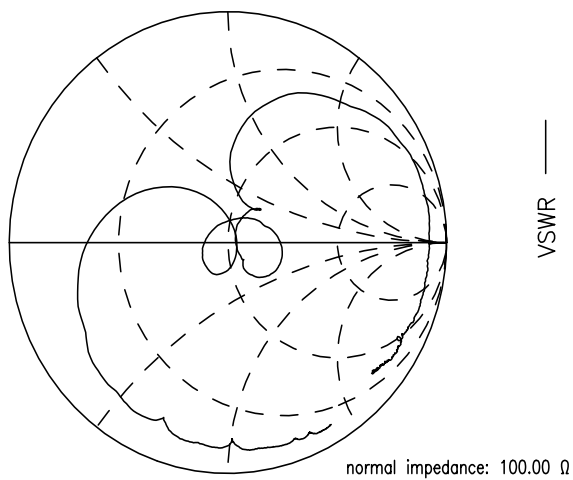


Smith chart

S_{11} function



S_{22} function



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**References**

Type	B9411
Ordering code	B39212B9411K610
Marking and package	C61157-A8-A14
Packaging	F61074-V8237-Z000
Date codes	L_1126
S-parameters	B9411_NB.s3p, B9411_WB.s3p see file header for port/pin assignment table
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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.

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