SAW Components

SAW Rx Filter

WCDMA Band I

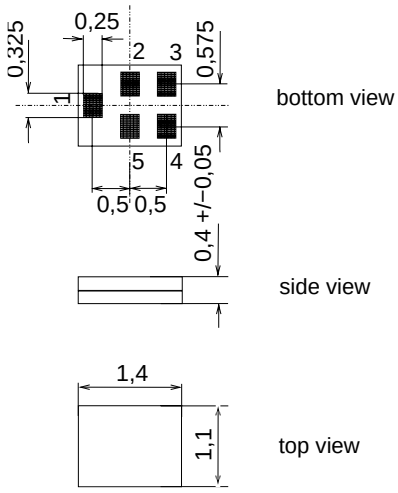
Series/Type:	**B9411**
Ordering code:	**B39212B9411K610**
Date:	November 27, 2008
Version:	2.2

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

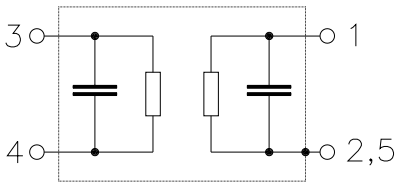
Features

- Package size 1.4 x 1.1 x 0.4 mm³
- Package code QCS5U
- RoHS compliant
- Approx. weight 0.003 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals



Pin configuration

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



Data Sheet SMD

Characteristics

Operating temperature range: T = –15 ˚C to +80 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 100 Ω || 20 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	$\Delta\alpha$	—	0.5	1.0	dB
2110.0 ... 2170.0 MHz	$\Delta\alpha_{5MHz}$ 2)	—	0.3	0.8	dB
Group delay ripple					
2110.0 ... 2170.0 MHz	$\Delta\tau_{5MHz}$ 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 ($\lvert S_{31}/S_{21}\rvert$)					
2110.0 ... 2170.0 MHz		–1.0	–0.7/0.7	1.0	dB
Output phase balance ($\phi(S_{31}) - \phi(S_{21})+180^\circ$)					
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

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

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

$f_{Carrier}$ 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)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

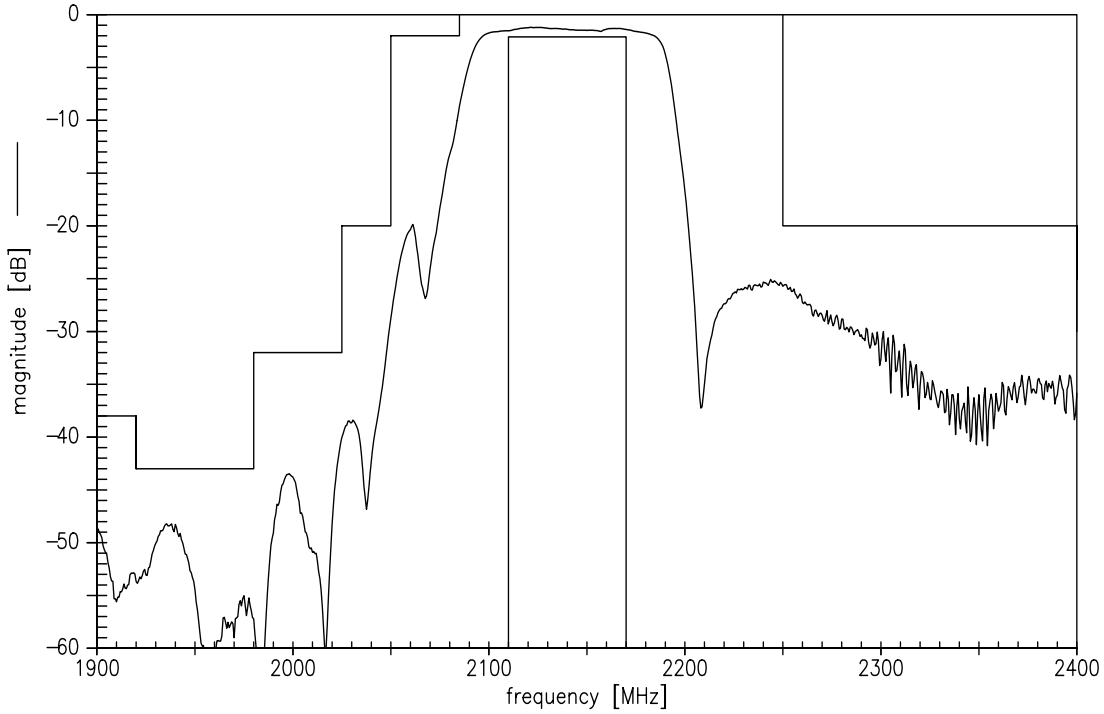
$$\int_{\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum ratings

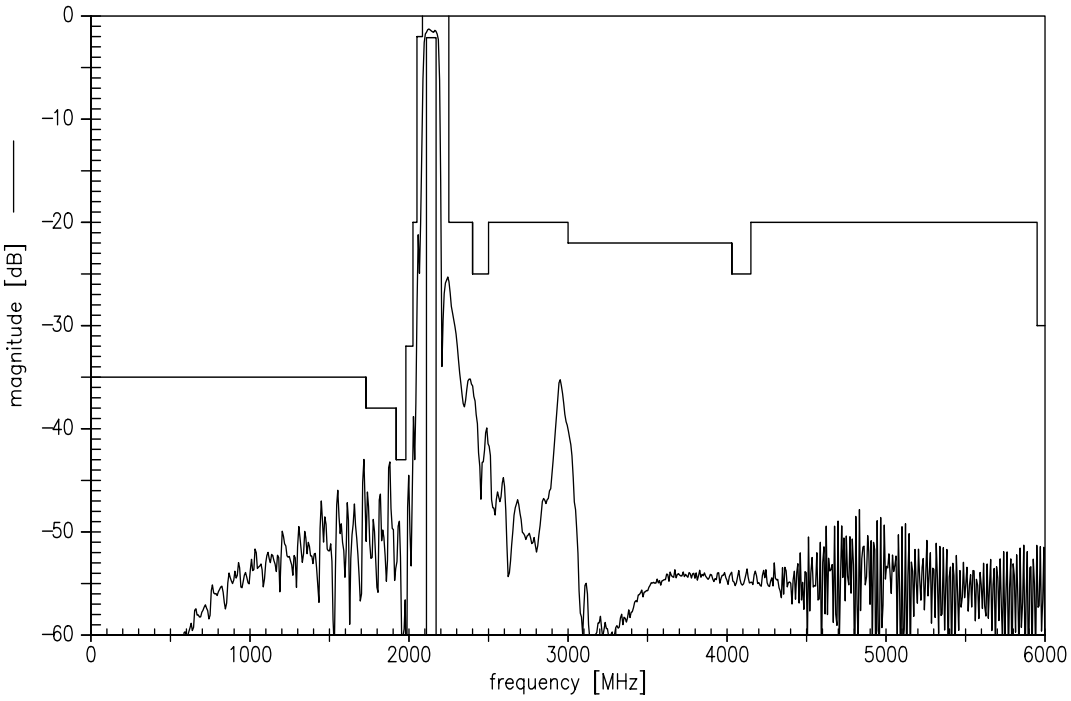
Operable temperature range	T	–30/+85	°C	
Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Source Power	P_S	5	dBm	cw signal

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

Transfer function

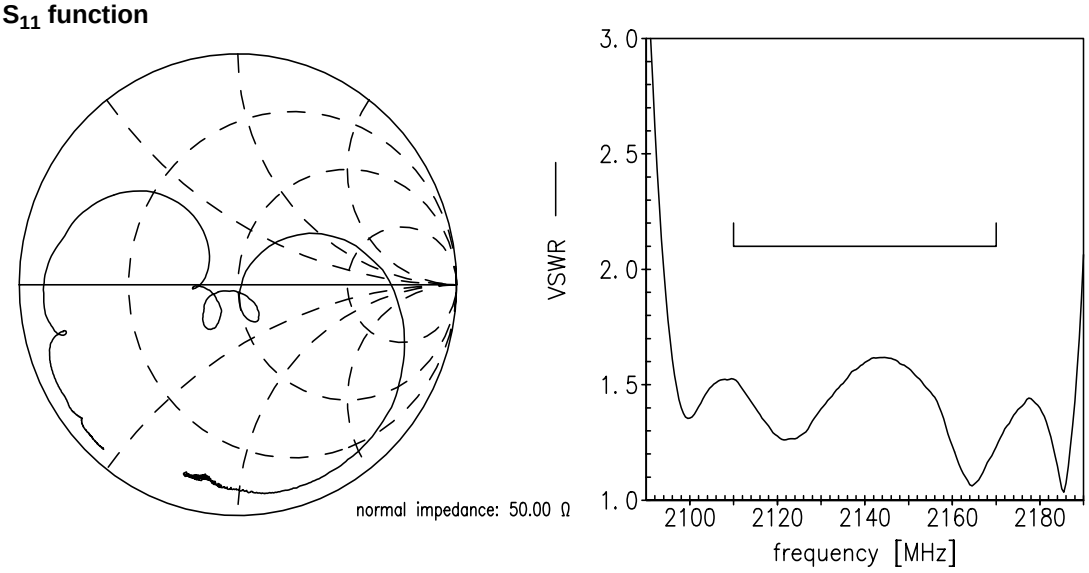


Transfer function (Wideband)

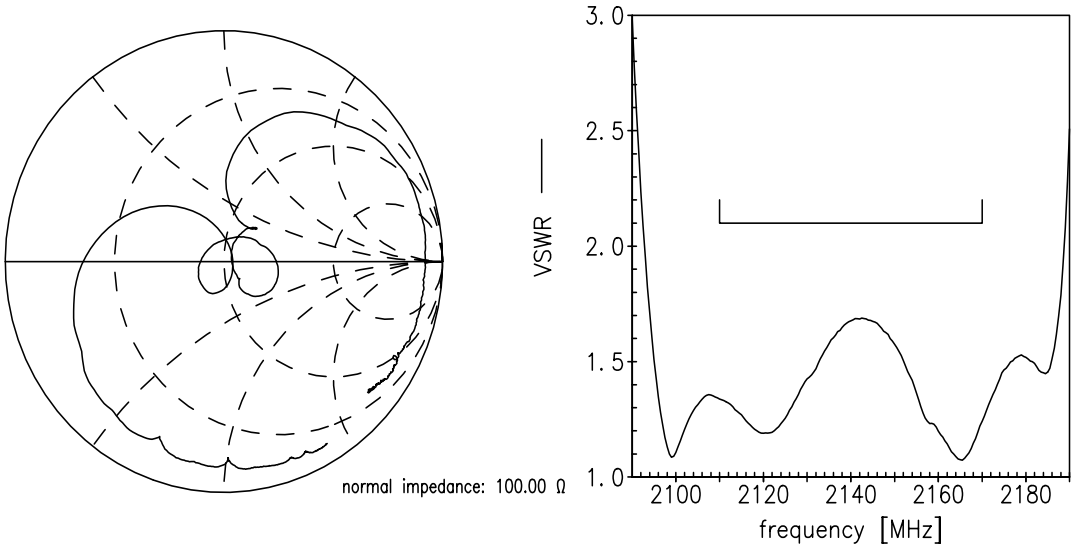


Smith chart

S_{11} function



S_{22} function



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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