



# SAW Components

## SAW Rx Filter

WCDMA Band I / Band IV / Band X

<b>Series/Type:</b>	<b>B9451</b>
<b>Ordering code:</b>	<b>B39212B9451P810</b>
<b>Date:</b>	<b>April 07, 2010</b>
<b>Version:</b>	<b>2.0</b>

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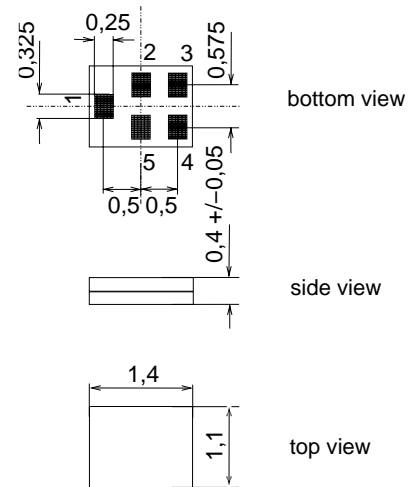
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**Application**

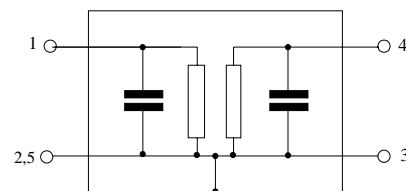
- Low-loss RF filter for mobile telephone WCDMA systems, receive path (RX)
- Useable for antenna diversity systems for WCDMA band I, IV, X
- Impedance 50  $\Omega$
- Unbalanced to unbalanced operation
- Very low insertion attenuation
- Very low amplitude ripple
- Very low Error Vector Magnitude (EVM)
- Very high Tx suppression for WCDMA band I, II, IV, V, X
- Usable passband 60 MHz


**Features**

- Package size 1.4 x 1.1 x 0.4 mm<sup>3</sup>
- Approx. weight 0.003 g
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


**Pin configuration**

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



Data sheet


**Characteristics**

Operating temperature range:  $T = -30\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega +2.7\text{nH (unbalanced)}$   
 Terminating load impedance:  $Z_L = 50\ \Omega +1.9\text{nH (unbalanced)}$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	2140.0	—	MHz
<b>Maximum insertion attenuation</b>					
	2110.0 ... 2155.0MHz	$\alpha_{\max}$	—	1.9	2.7 dB
	2110.0 ... 2170.0MHz	$\alpha_{\max}$	—	1.9	2.7 dB
	@ $f_{\text{Carrier}}$ 2112.4 ... 2167.6MHz	$\alpha_{\text{WCDMA}}^{1)}$	—	2.1	2.7 dB
<b>Amplitude ripple (p-p)</b>					
	2110.0 ... 2155.0MHz	$\Delta\alpha$	—	0.5	1.2 dB
	2110.0 ... 2170.0MHz		—	0.5	1.2 dB
<b>Error Vector Magnitude</b>					
	@ $f_{\text{Carrier}}$ 2112.4 ... 2167.6MHz	EVM <sup>2)</sup>	—	1.1	1.9 %
<b>Input VSWR</b>					
	2110.0 ... 2155.0MHz		—	1.6	2.0
	2110.0 ... 2170.0MHz		—	1.6	2.0
<b>Output VSWR</b>					
	2110.0 ... 2155.0MHz		—	1.6	2.0
	2110.0 ... 2170.0MHz		—	1.6	2.0
<b>Attenuation</b>					
	0.0 ... 810.0MHz	$\alpha$	35	50	— dB
	810.0 ... 849.0MHz		46	50	— dB
	849.0 ... 898.0MHz		35	49	— dB
	898.0 ... 925.0MHz		46	49	— dB
	925.0 ... 1710.0MHz		35	48	— dB
	1710.0 ... 1770.0MHz		50	54	— dB
	1770.0 ... 1850.0MHz		35	57	— dB
	1850.0 ... 1980.0MHz		44	48	— dB
	2400.0 ... 2484.0MHz		30	50	— dB
	2484.0 ... 4220.0MHz		10	36	— dB
	4220.0 ... 4340.0MHz		15	36	— dB
	4340.0 ... 6000.0MHz		10	34	— dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation below.

2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.


**Annotation for characteristics section**

Attenuation of WCDMA signal ("Powertransferfunction",  $\alpha_{\text{WCDMA}}$ ) is determined by

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

$f_{\text{Carrier}}$  according to 3GPP TS 25.101 (e.g. for UMTS-Passband,  $f_{\text{Carrier}}$  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**

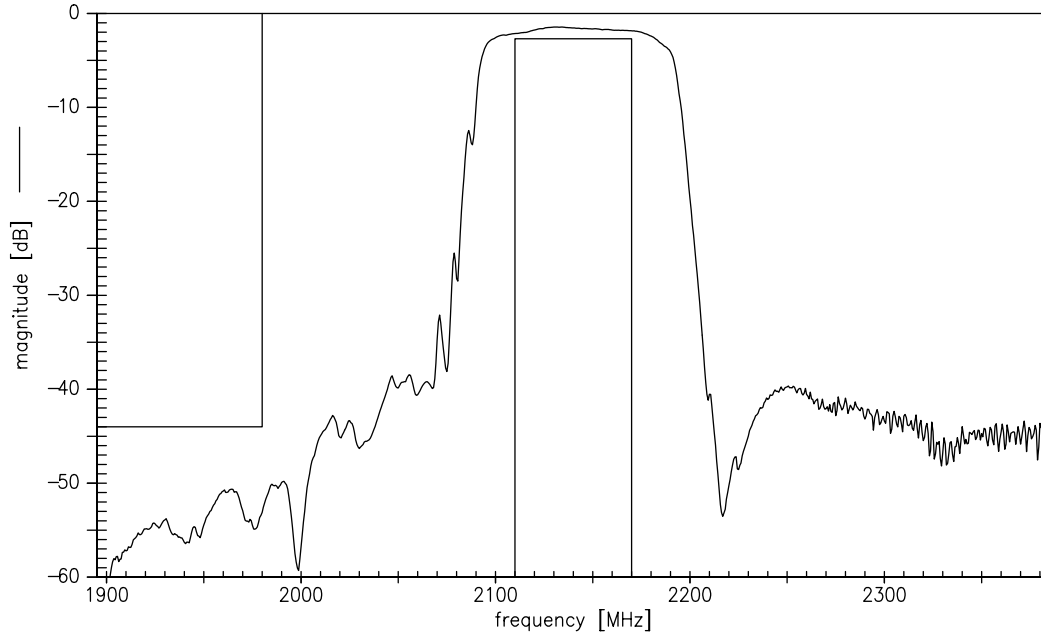
Operable temperature range	T	-30/+85	°C	
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	100 <sup>1)</sup>	V	machine model, 1 pulse
Source Power	P <sub>S</sub>	15	dBm	cw signal @ 50°C

<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

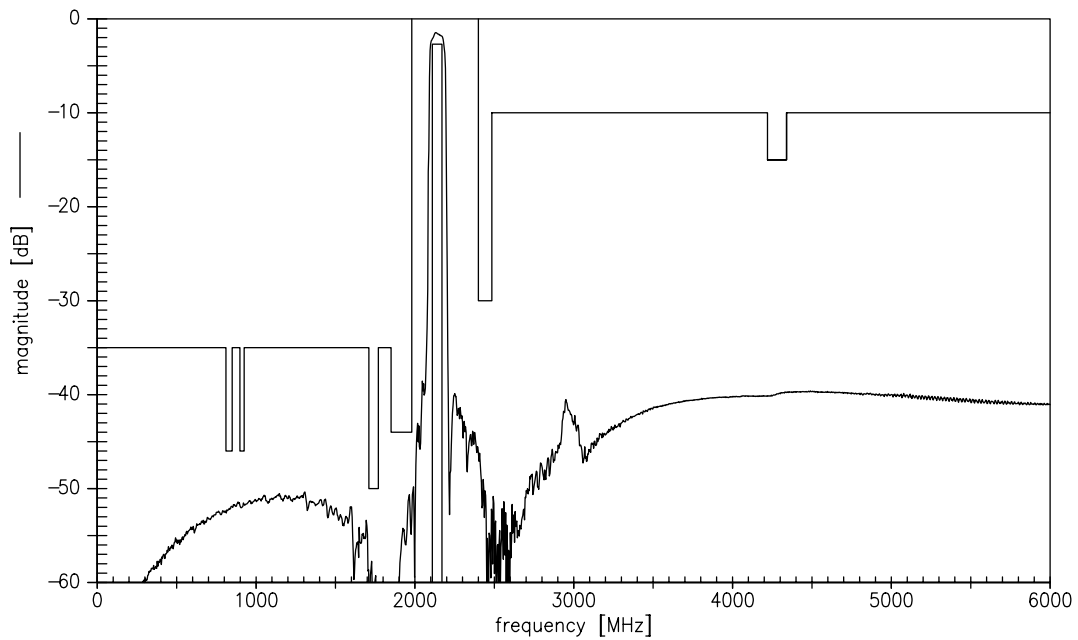
Data sheet



Transfer function



Transfer function (wideband)

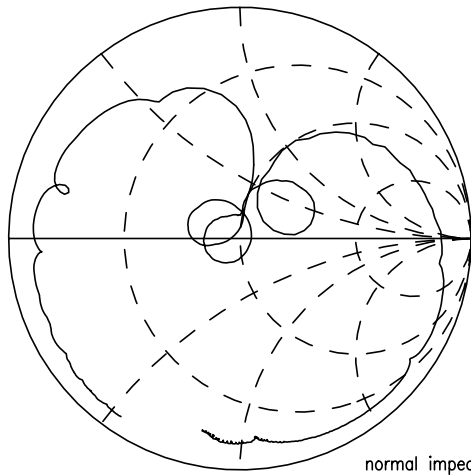


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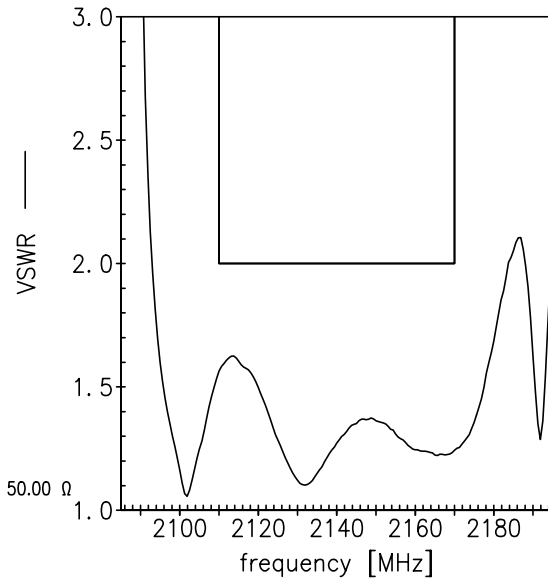


Smith chart

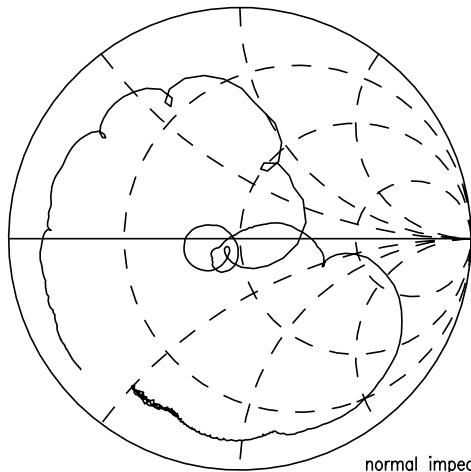
$S_{11}$  function



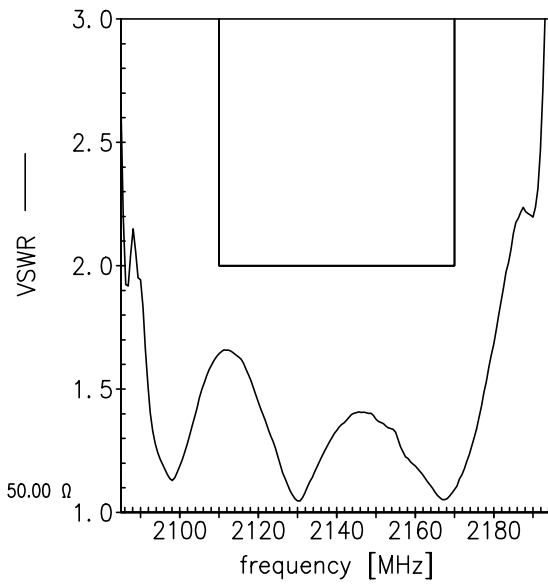
normal impedance: 50.00  $\Omega$



$S_{22}$  function



normal impedance: 50.00  $\Omega$



<b>SAW Components</b>	<b>B9451</b>
<b>SAW Filter</b>	<b>2140.0 MHz</b>

Data sheet



**References**

<b>Type</b>	B9451
<b>Ordering code</b>	B39212B9451P810
<b>Marking and Package</b>	C61157-A8-A14
<b>Packaging</b>	F61074-V8237-Z000
<b>Date Codes</b>	L_1126
<b>S-Parameters</b>	B9451_NB.s2p B9451_WB.s2p see file header for port/pin assignment table
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	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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