



# SAW Components

## SAW Diversity Rx Filter

WCDMA Band II

<b>Series/type:</b>	<b>B9860</b>
<b>Ordering code:</b>	<b>B39202B9860P810</b>
Date:	August 07, 2012
Version:	2.1

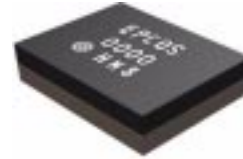
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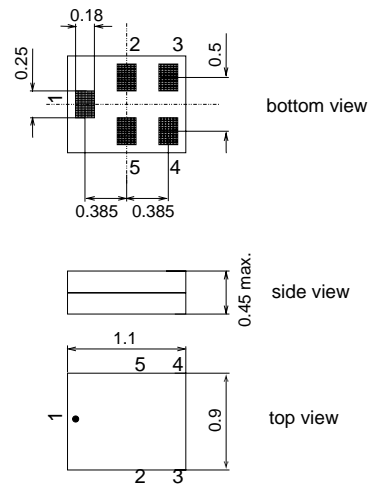
Data sheet


**Application**

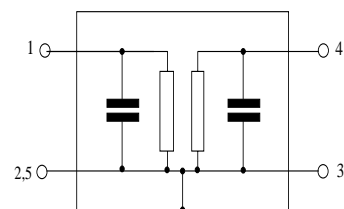
- Low-loss RF filter for mobile telephone WCDMA Band II systems (diversity) receive path (Rx)
- Usable for diversity application
- Unbalanced to balanced operation
- Low amplitude ripple
- Usable passband: 60 MHz
- Impedance transformation from 50  $\Omega$  to 100  $\Omega$
- Suitable for GPRS class 1 to 12


**Features**

- Package size 1.1 x 0.9 mm<sup>2</sup>
- max. Package height 0.45 mm
- RoHS compatible
- Approx. weight 0.001g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


**Pin configuration**

- 1 Input, unbalanced
- 3,4 Output, balanced
- 2,5 Case-ground



Data sheet


**Characteristics**

Temperature range for specification:  $T = -20\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$   
 Terminating load impedance:  $Z_L = 100\ \Omega \parallel 33\text{ nH}$

		min.	typ. @ 25°C	max.	
<b>Center frequency</b>	$f_C$	—	1960.0	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$				
	1930.0 ... 1990.0MHz	—	2.5	3.3	dB
@ $f_{\text{carrier}}$	1932.4 ... 1987.6MHz $\alpha_{\text{WCDMA}}^{1)}$	—	2.2	3.0	dB
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$				
	1930.0 ... 1990.0MHz	—	1.1	1.9	dB
<b>Error Vector Magnitude</b>	EVM <sup>2)</sup>				
@ $f_{\text{carrier}}$	1932.4 ... 1987.6MHz	—	2.6	4.5	%
<b>Input VSWR</b>					
	1930.0 ... 1990.0MHz	—	1.9	2.3	
<b>Output VSWR</b>					
	1930.0 ... 1990.0MHz	—	2.0	2.4	
<b>CMRR (<math> S_{21}-S_{31}  /  S_{21}+S_{31} </math>)</b>					
	1930.0 ... 1990.0MHz	20	26	—	dB
<b>Attenuation</b>	$\alpha$				
	10.0 ... 810.0MHz	50	73	—	dB
	810.0 ... 849.0MHz	60	71	—	dB
	849.0 ... 898.0MHz	60	72	—	dB
	898.0 ... 925.0MHz	60	71	—	dB
	925.0 ... 1850.0MHz	40	50	—	dB
	1850.0 ... 1910.0MHz	40	47	—	dB
@ $f_{\text{carrier}}$	1852.4 ... 1907.6MHz $\alpha_{\text{WCDMA}}^{3)}$	42	52	—	dB
	2400.0 ... 2484.0MHz	45	60	—	dB
	2484.0 ... 6000.0MHz	40	46	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on following page.

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 Passband,  $f_{\text{Carrier}}$  ranges from 1932.4 MHz (lowest Rx channel) to 1987.6 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:

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

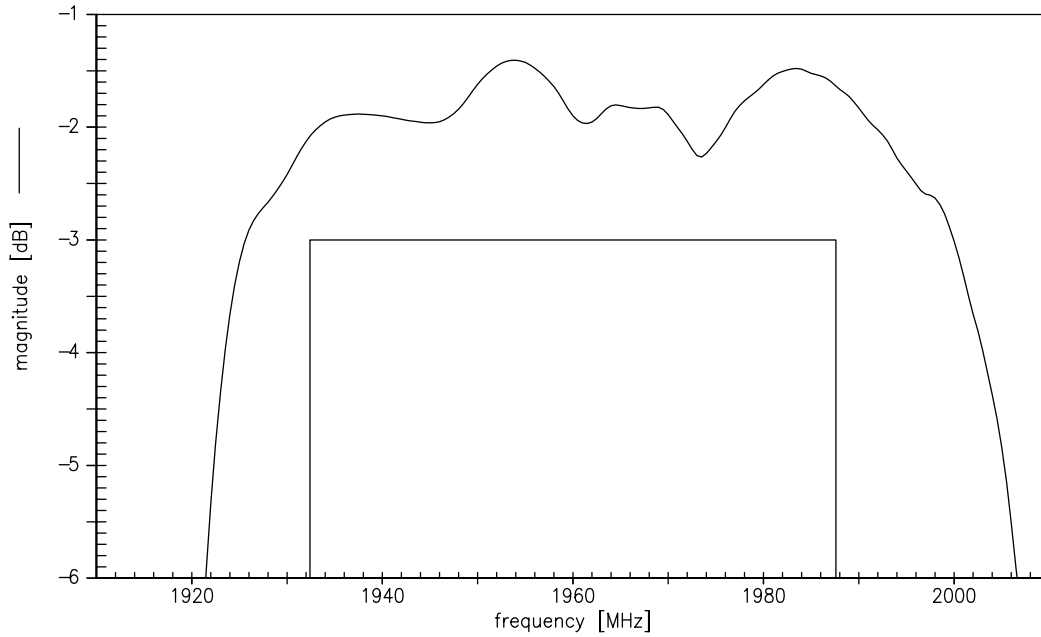
**Maximum ratings**

Operable temperature range	T	-40/+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>	50 <sup>1)</sup>	V	machine model, 10 pulses
Input Power at 1850.0 ... 1910.0MHz	P <sub>IN</sub>	21	dBm	CW signal for 2000h at T = 55 °C

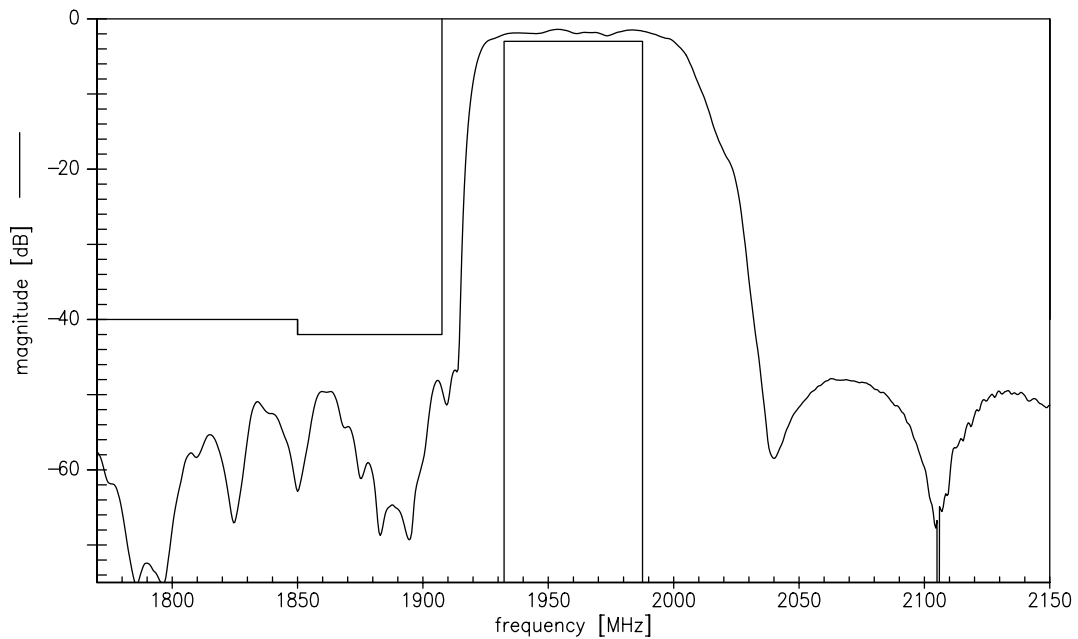
<sup>1)</sup> acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



Transfer function for WCDMA signals (Power transfer function passband)



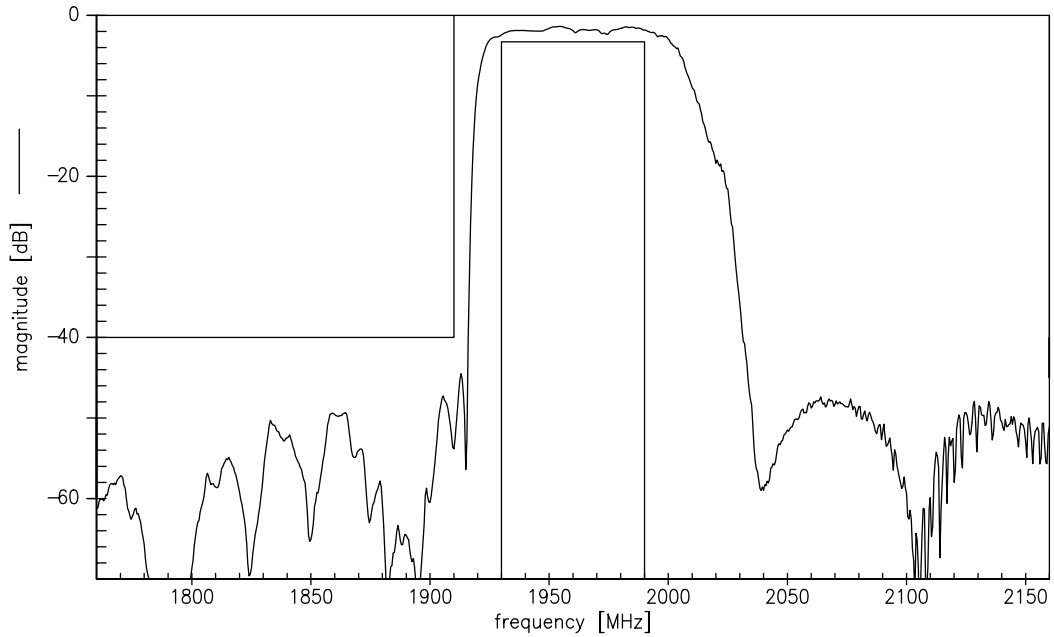
Transfer function for WCDMA signals (Power transfer function narrowband)



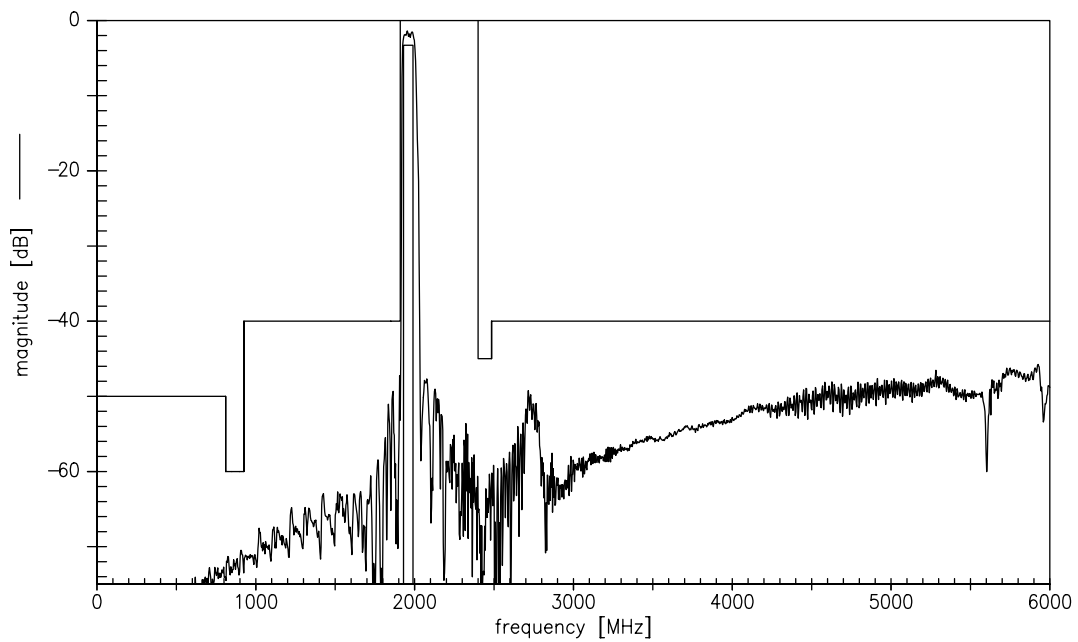
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Transfer function (narrowband)



Transfer function (wideband)

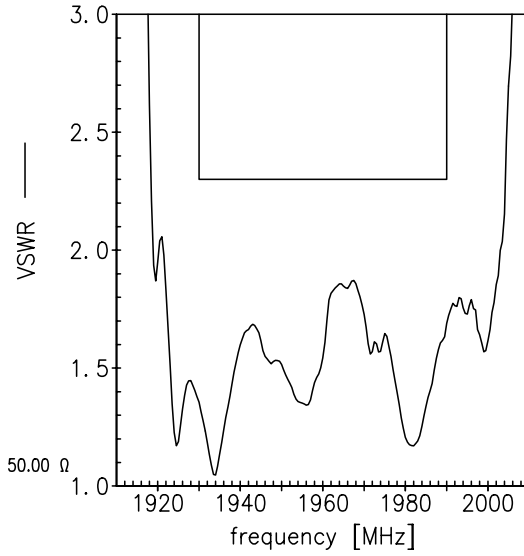
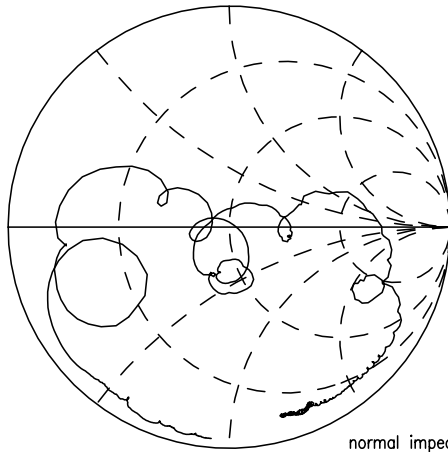


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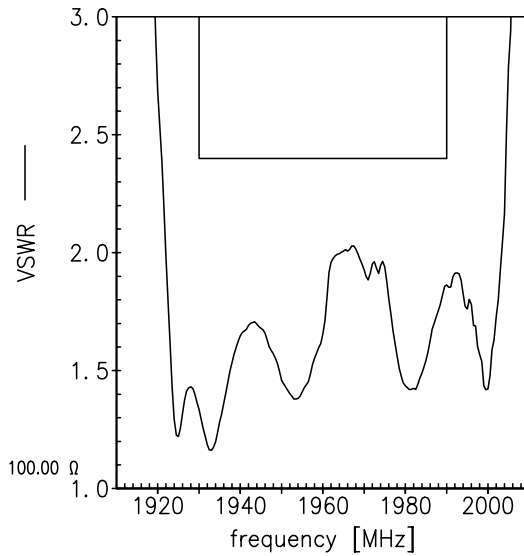
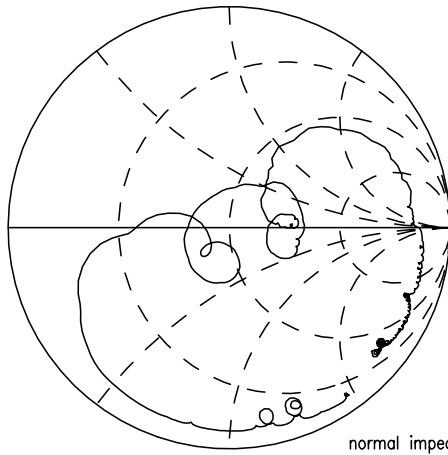


Smith Charts

$S_{11}$  function



$S_{22}$  function



<b>SAW Components</b>	<b>B9860</b>
<b>SAW Diversity Rx Filter</b>	<b>1960.0 MHz</b>

Data sheet



References

<b>Type</b>	B9860
<b>Ordering code</b>	B39202B9860P810
<b>Marking and package</b>	C61175-A8-A3
<b>Packaging</b>	F61074-V8237-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9860_NB_UN.s3p, B9860_WB_UN.s3p 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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