



## **SAW Components**

### **SAW RX filter**

WCDMA band VIII / GSM 900

<b>Series/type:</b>	<b>B9461</b>
<b>Ordering code:</b>	<b>B39941B9461P810</b>
<b>Date:</b>	<b>January 13, 2010</b>
<b>Version:</b>	<b>2.0</b>



Data sheet



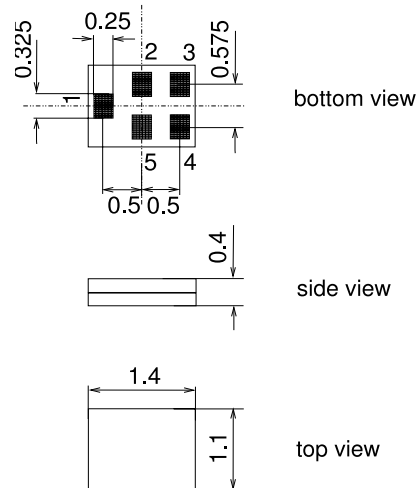
Application

- Low-loss RF filter for mobile telephone WCDMA Band VIII and GSM 900 systems, receive path (RX)
- Very high TX suppression - suitable for diversity applications
- Useable passband: 35 MHz
- Unbalanced to balanced operation
- Impedance transformation from 50 Ω to 100 Ω
- Suitable for GPRS class 1 to 12



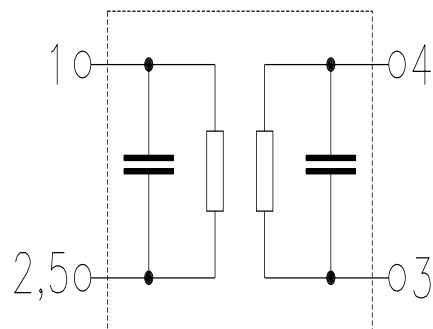
Features

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



Pin configuration

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





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**942.5 MHz**

**Data sheet**



**Characteristics**

Temperature range for specification: T = -20 °C to +85 °C  
 Terminating source impedance: Z<sub>S</sub> = 50 Ω (unbalanced)  
 Terminating load impedance: Z<sub>L</sub> = 100 Ω (balanced)

						<b>B9461</b>			
						<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>	
<b>Center frequency</b>		f <sub>C</sub>				—	942.5	—	MHz
<b>Maximum insertion attenuation</b>									
@f <sub>Carrier Bd 8 RX</sub>	927.4 ... 957.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>		—	2.6	3.0		dB
@f <sub>Carrier Bd 8 RX</sub>	925.7 ... 959.3	MHz	α <sub>LTE</sub> <sup>2)</sup>		—	2.7	3.6		dB
	925.0 ... 960.0	MHz	α <sub>GSM</sub>		—	2.8	4.0		dB
<b>Amplitude ripple (p-p)</b>									
	925.0 ... 960.0	MHz	Δα		—	1.5	2.7		dB
<b>Error Vector Magnitude<sup>3)</sup></b>									
@f <sub>Carrier Bd 8 RX</sub>	927.4 ... 957.6	MHz	EVM		—	3.2	6.0		%
<b>Input VSWR</b>									
	925.0 ... 960.0	MHz			—	2.0	2.2		
<b>Output VSWR</b>									
	925.0 ... 960.0	MHz			—	2.1	2.3		
<b>CMRR ( S<sub>21</sub>-S<sub>31</sub>  /  S<sub>21</sub>+S<sub>31</sub> )</b>									
	925.0 ... 960.0	MHz			21	23 <sup>4)</sup>	—		dB
<b>Attenuation</b>									
	DC ... 880.0	MHz	α		40	59	—		dB
@f <sub>Carrier Bd 8 TX</sub>	882.4 ... 912.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>		50	55	—		dB
@f <sub>Carrier Bd 8 TX</sub>	880.7 ... 914.3	MHz	α <sub>LTE</sub> <sup>2)</sup>		41	52	—		dB
	880.0 ... 915.0	MHz	α <sub>GSM</sub>		35	51	—		dB
	980.0 ... 1045.0	MHz			24	29	—		dB
	1045.0 ... 1700.0	MHz			35	51	—		dB
	1700.0 ... 2600.0	MHz			40	60	—		dB
	2600.0 ... 2682.0	MHz			45	60	—		dB
	2682.0 ... 4345.0	MHz			40	53	—		dB
	4345.0 ... 4470.0	MHz			45	60	—		dB
	4470.0 ... 6000.0	MHz			45	57	—		dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 7).  
 2) Attenuation of LTE signal ("Powertransferfunction"). Please refer to annotation on page (7).  
 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.  
 4) A CMRR of 22.8 dB corresponds to a phase balance of 5° together an amplitude balance of 1.0 dB



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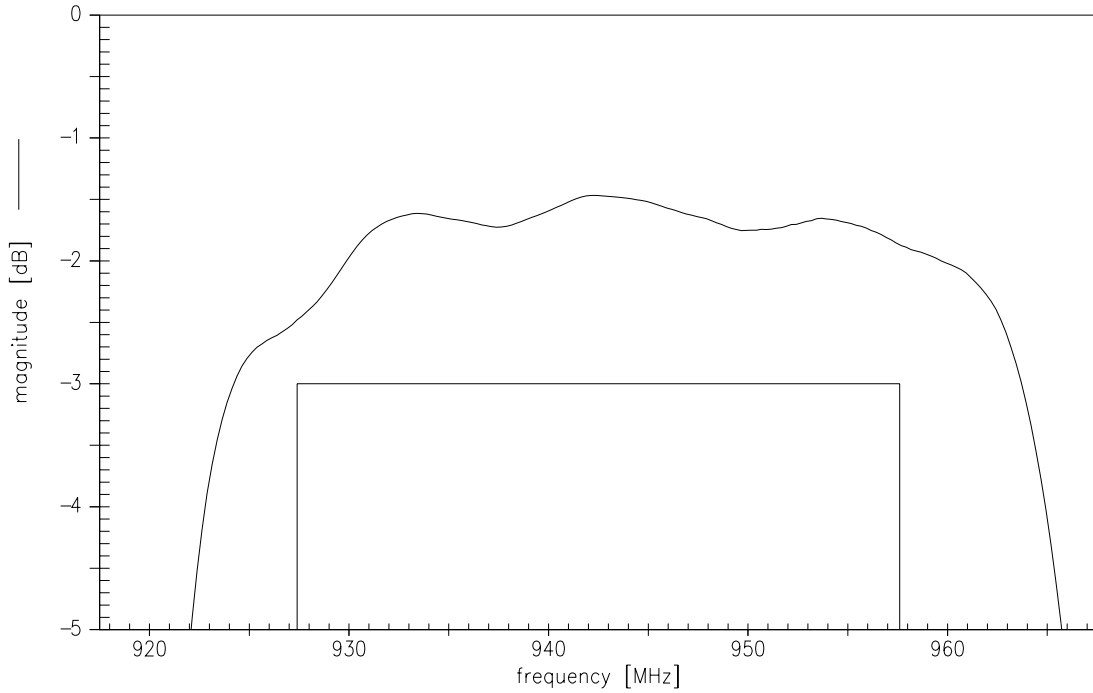
SAW RX filter

942.5 MHz

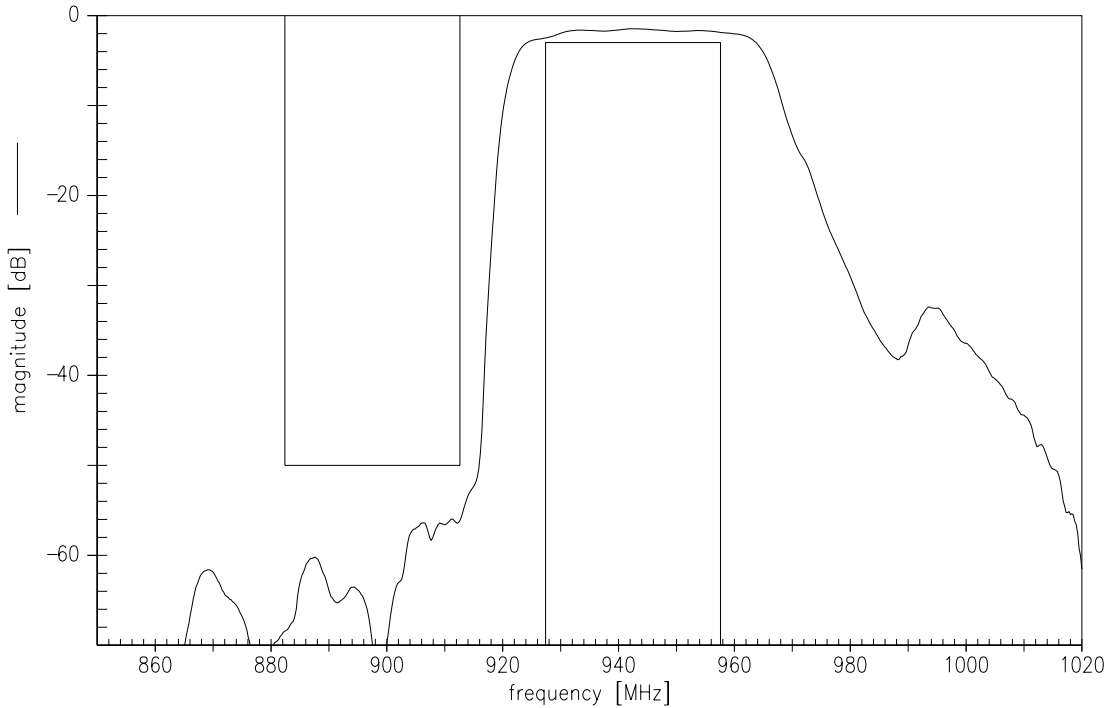
Data sheet



**Transfer function for WCDMA signals (Powertransferfunction vs. carrier frequency)**



**Transfer function for WCDMA signals (Powertransferfunction vs. carrier frequency)**



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



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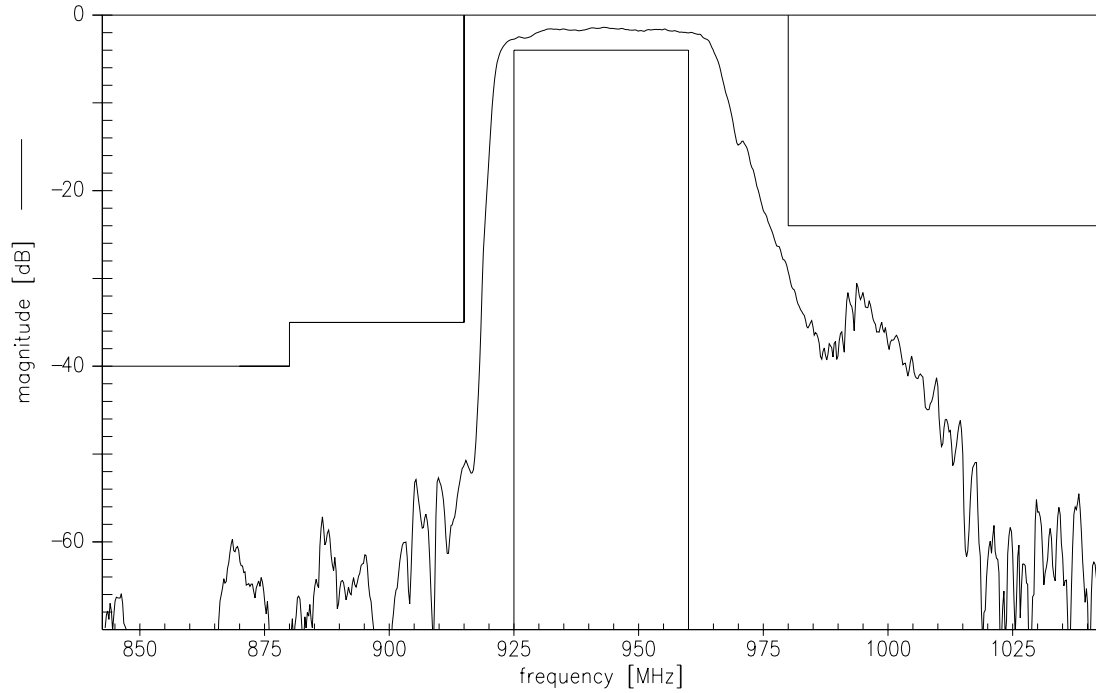
SAW RX filter

942.5 MHz

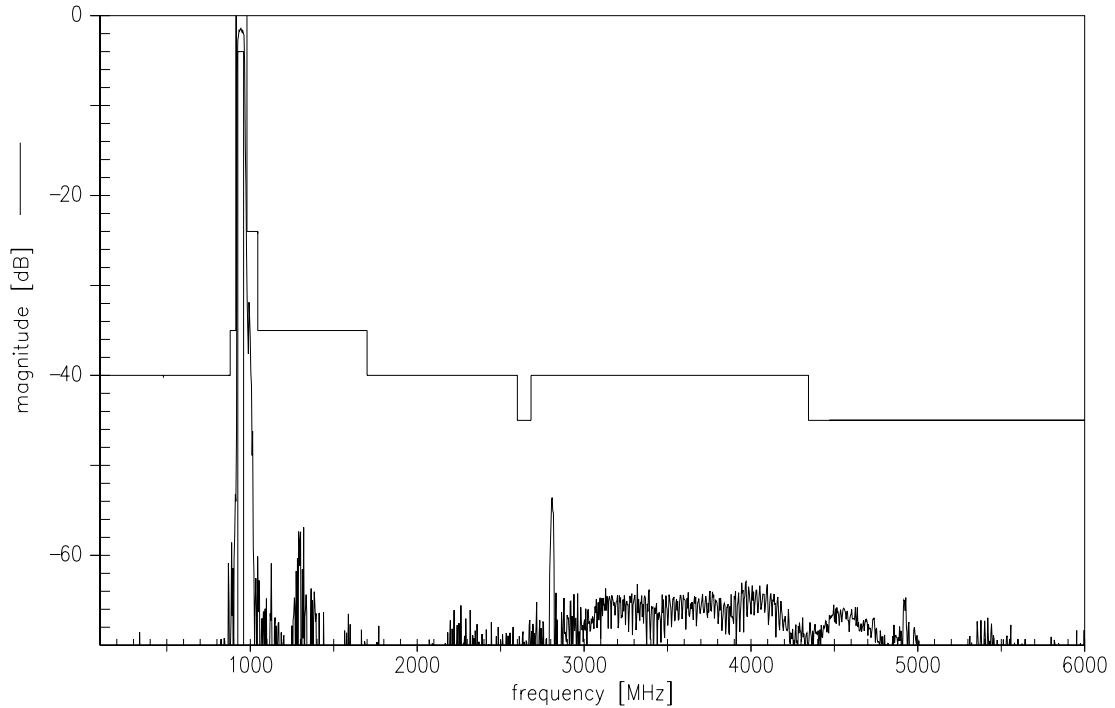
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Transfer function for CW signals



Transfer function for CW signals (wideband)



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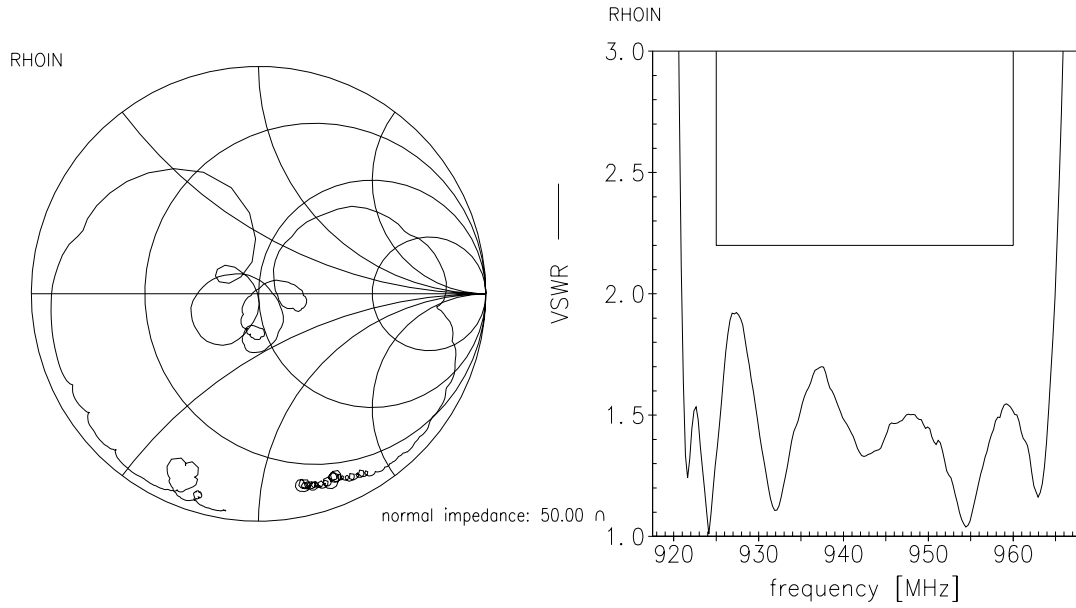


Data sheet

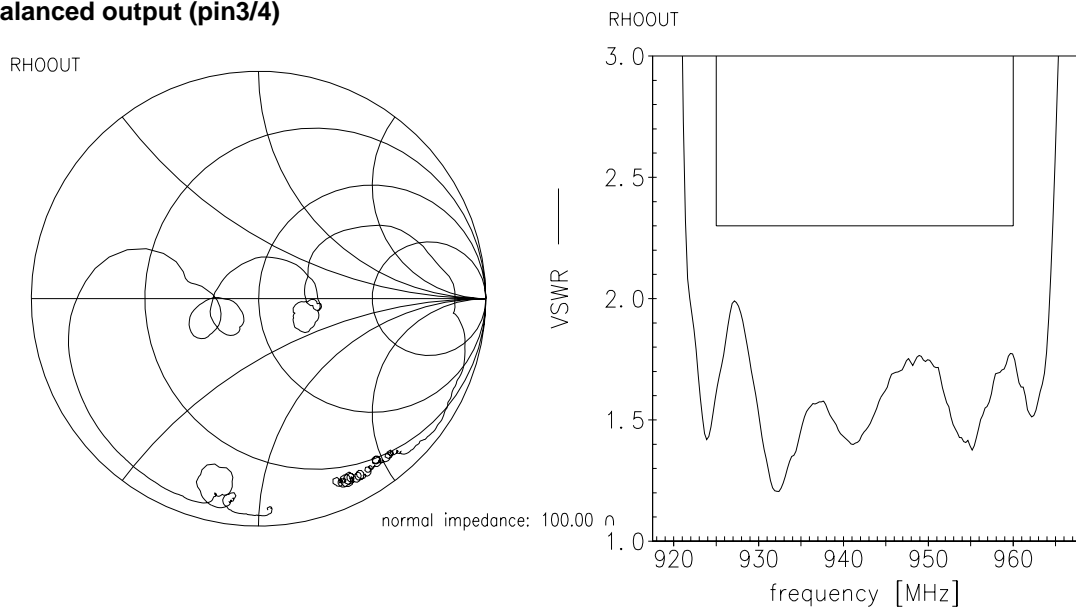


Smith charts

Unbalanced input (pin1)



Balanced output (pin3/4)



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**Annotation for characteristics section**

Attenuation of WCDMA and LTE signal (“Powertransferfunction”,  $\alpha_{\text{WCDMA}}$ ,  $\alpha_{\text{LTE}}$ ) are determined by

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

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

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

$f_{\text{Carrier}}$  of WCDMA signal according to 3GPP TS 25.101 (e.g. for band VIII RX passband,  $f_{\text{Carrier}}$  ranges from 927.4 MHz ( $f_{\text{C}}$  of lowest Rx channel) to 957.6 MHz ( $f_{\text{C}}$  of highest Rx channel)).

$f_{\text{Carrier}}$  of LTE signal according to 3GPP TS 36.101 with a channel band width of 1.08 MHz (equals 6 Resource Blocks) and a guard band of 0.16 MHz (e.g. for band VIII RX passband,  $f_{\text{Carrier}}$  ranges from 925.7 MHz ( $f_{\text{C}}$  of lowest Rx channel) to 959.3 MHz ( $f_{\text{C}}$  of highest Rx channel)).

**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>	100 <sup>1)</sup>	V	machine model, 10 pulses
Input power	P <sub>IN</sub>	17	dBm	10000h @ 55°C

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



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## References

<b>Type</b>	B9461
<b>Ordering code</b>	B39941B9461P810
<b>Marking and package</b>	C61157-A8-A3
<b>Packaging</b>	F61074-V8237-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9461_NB.s3p B9461_WB.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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