



## **SAW Components**

### **SAW Rx 2in1 filter**

GSM 850 / GSM 1900

<b>Series/type:</b>	<b>B9310</b>
<b>Ordering code:</b>	<b>B39202B9310G110</b>
<b>Date:</b>	<b>Aug 17, 2006</b>
<b>Version:</b>	<b>2.1</b>



## SAW Components

B9310

### SAW Rx 2in1 filter

881.5 / 1960.0 MHz

#### Data sheet



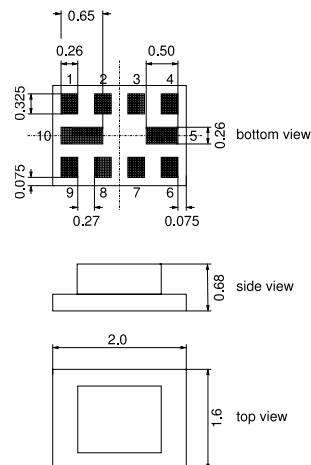
#### Application

- Low-loss 2-in-1 RF filter for mobile telephone  
GSM 850 and GSM 1900 bands, receive path (Rx)
- Usable passband:  
Filter 1 (GSM 1900): 60 MHz  
Filter 2 (GSM 850): 25 MHz
- Unbalanced to balanced operation for both filters
- Very low insertion attenuation
- Low amplitude ripple
- Impedance transformation from 50  $\Omega$  to 150  $\Omega$  for both filters
- Suitable for GPRS class 1 to 12



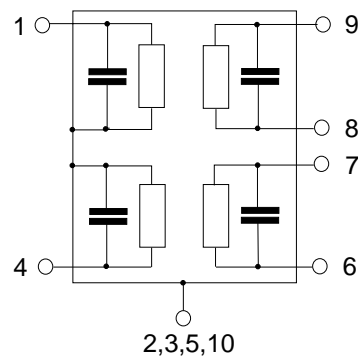
#### Features

- Package size 2.0 x 1.6 x 0.68 mm<sup>3</sup>
- Package code QCS10H
- RoHS compatible
- Approximate weight 0.008 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**



#### Pin configuration

- 1 Input [Filter 1]
- 4 Input [Filter 2]
- 6,7 Output, balanced [Filter 2]
- 8,9 Output, balanced [Filter 1]
- 2,3,5,10 To be grounded





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### Characteristics of Filter 1 (GSM 1900)

Temperature range for specification:	T = -20 °C to +85 °C
Terminating source impedance:	Z <sub>S</sub> = 50 Ω
Terminating load impedance:	Z <sub>L</sub> = 150 Ω    18 nH (balanced)

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	f <sub>C</sub>	—	1960.0	—	MHz
<b>Maximum insertion attenuation</b>	α <sub>max</sub>	—	1.6 <sup>1)</sup>	2.3 <sup>2)</sup>	dB
1930.0 ... 1990.0 MHz		—			
<b>Amplitude ripple (p-p)</b>	Δα	—	0.6	1.3 <sup>3)</sup>	dB
1930.0 ... 1990.0 MHz		—			
<b>Input VSWR</b>		—	1.7	2.0	
1930.0 ... 1990.0 MHz		—			
<b>Output VSWR</b>		—	1.7	2.0	
1930.0 ... 1990.0 MHz		—			
<b>Output amplitude balance ( S<sub>31</sub>/S<sub>21</sub> )</b>		-1.2	-0.7/0.7	1.2	dB
1930.0 ... 1990.0 MHz					
<b>Output phase balance (φ(S<sub>31</sub>) - φ(S<sub>21</sub>)+180°)</b>		-10	-5.0/3.0	10	°
1930.0 ... 1990.0 MHz					
<b>Differential to common mode suppression</b>	S <sub>sc12</sub>	22	30	—	dB
1930.0 ... 1990.0 MHz					
<b>Attenuation</b>	α				
10.0 ... 1200.0 MHz		40	43	—	dB
1200.0 ... 1510.0 MHz		35	40	—	dB
1510.0 ... 1830.0 MHz		30	35	—	dB
1830.0 ... 1850.0 MHz		26	32	—	dB
1850.0 ... 1890.0 MHz		23	27	—	dB
1890.0 ... 1910.0 MHz		12 <sup>4)</sup>	16	—	dB
2010.0 ... 2070.0 MHz		12 <sup>5)</sup>	15	—	dB
2070.0 ... 2400.0 MHz		21	25	—	dB
2400.0 ... 2500.0 MHz		35	45	—	dB
2500.0 ... 3860.0 MHz		28	32	—	dB
3860.0 ... 3980.0 MHz		35	45	—	dB
3980.0 ... 5790.0 MHz		28	40	—	dB
5790.0 ... 6000.0 MHz		35	41	—	dB

<sup>1)</sup> Typical value excluding PCB losses of 0.29 dB

<sup>2)</sup> 2.1 dB max at +25 °C

<sup>3)</sup> 1.0 dB max at +25 °C

<sup>4)</sup> 13 dB max at +25 °C

<sup>5)</sup> 13 dB max at +25 °C

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



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#### Maximum ratings of Filter 1

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				
GSM 850, GSM 900	P <sub>IN</sub>	15	dBm	peak power of GSM signal
GSM 1800, GSM 1900	P <sub>IN</sub>	15	dBm	duty cycle 4:8
Tx bands				

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



SAW Components

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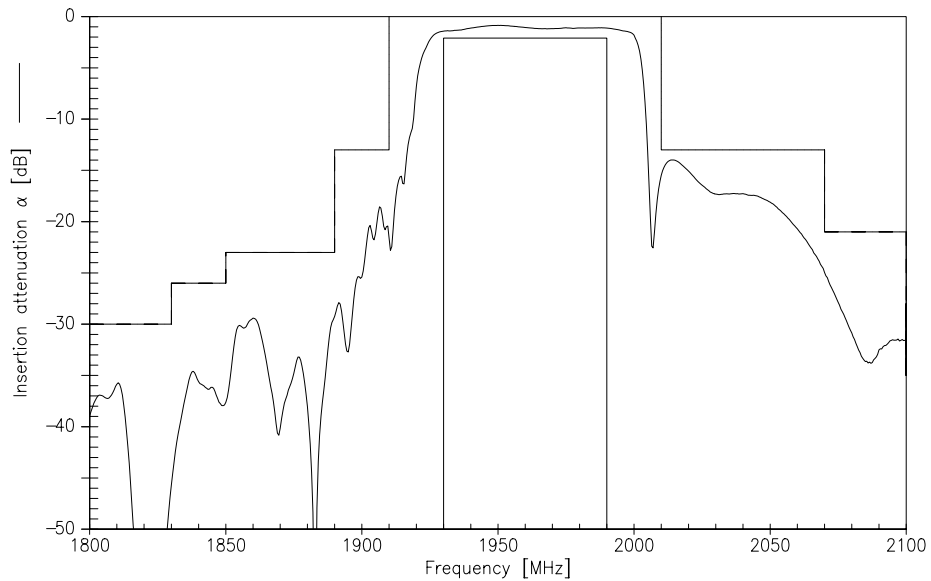
SAW Rx 2in1 filter

881.5 / 1960.0 MHz

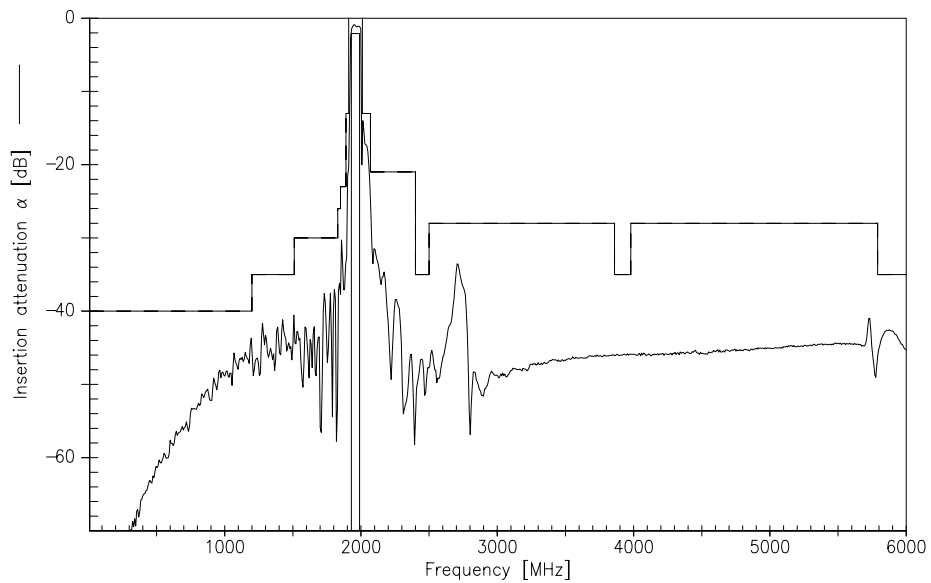
Data sheet



### Transfer function of Filter 1



### Transfer function of Filter 1 (wideband)



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



## SAW Components

B9310

### SAW Rx 2in1 filter

881.5 / 1960.0 MHz

#### Data sheet



#### Characteristics of Filter 2 (GSM 850)

Temperature range for specification:

$T = -20\text{ °C to }+85\text{ °C}$

Terminating source impedance:

$Z_S = 50\ \Omega$

Terminating load impedance:

$Z_L = 150\ \Omega \parallel 82\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	881.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	1.2 <sup>1)</sup>	1.8 <sup>2)</sup>	dB
869.0 ... 894.0 MHz		—			
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.5	1.0 <sup>3)</sup>	dB
869.0 ... 894.0 MHz		—			
<b>Input VSWR</b>		—	1.7	2.0	
869.0 ... 894.0 MHz		—			
<b>Output VSWR</b>		—	1.7	2.0	
869.0 ... 894.0 MHz		—			
<b>Output amplitude balance (<math> S_{31}/S_{21} </math>)</b>		—1.0	—0.2/0.5	1.0	dB
869.0 ... 894.0 MHz					
<b>Output phase balance (<math>\phi(S_{31}) - \phi(S_{21}) + 180^\circ</math>)</b>		—10	—4.0/3.0	10	°
869.0 ... 894.0 MHz					
<b>Attenuation</b>	$\alpha$				
10.0 ... 447.0 MHz		45	53	—	dB
447.0 ... 849.0 MHz		30	34	—	dB
914.0 ... 1000.0 MHz		25	27	—	dB
1000.0 ... 1738.0 MHz		28	37	—	dB
1738.0 ... 1788.0 MHz		40	60	—	dB
1788.0 ... 3476.0 MHz		35	50	—	dB
3476.0 ... 6000.0 MHz		40	48	—	dB

<sup>1)</sup> Typical value excluding PCB losses of 0.15 dB

<sup>2)</sup> 1.7 dB max at +25 °C

<sup>3)</sup> 0.9 dB max at +25 °C



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<b>SAW Rx 2in1 filter</b>	<b>881.5 / 1960.0 MHz</b>

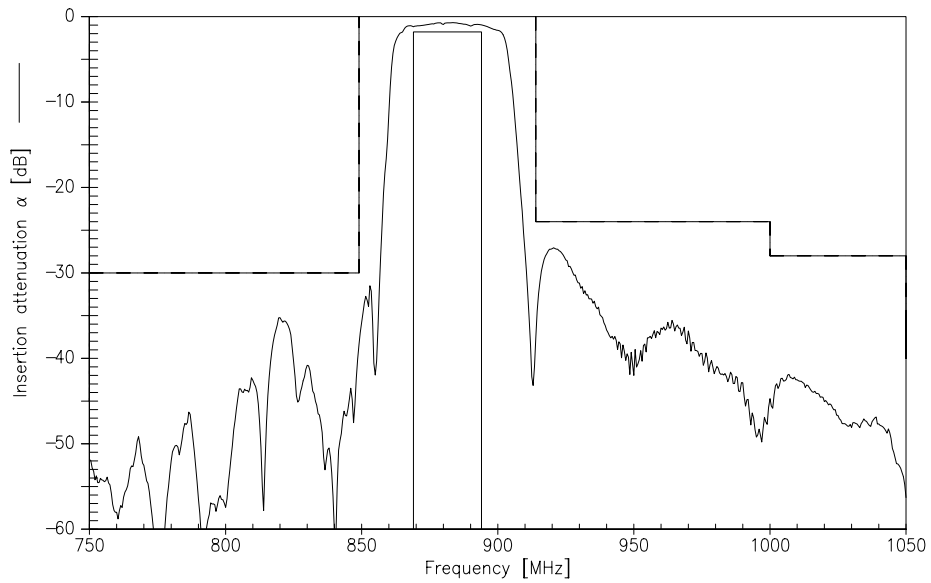
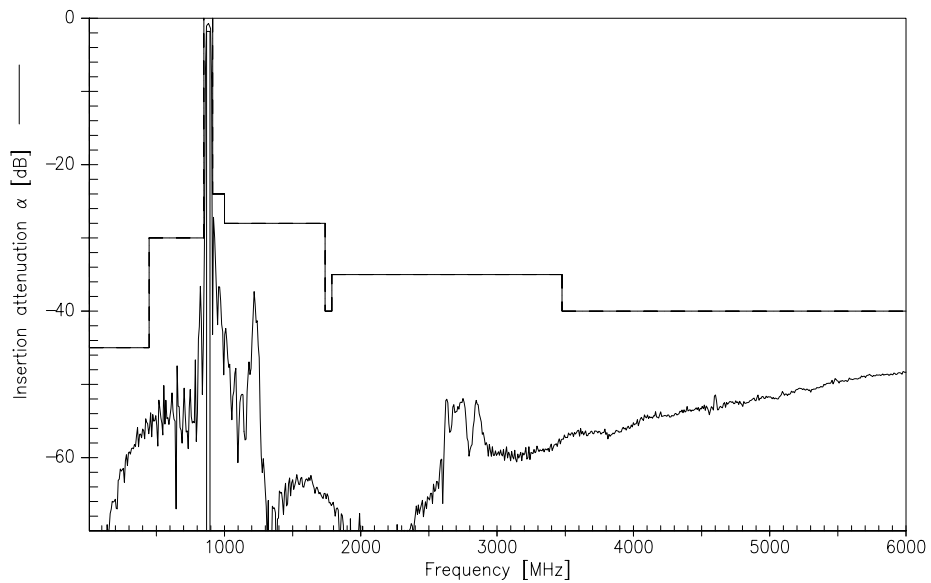
Data sheet



#### Maximum ratings of Filter 2

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 at				
GSM 850, GSM 900	P <sub>IN</sub>	15	dBm	peak power of GSM signal
GSM 1800, GSM 1900	P <sub>IN</sub>	15	dBm	duty cycle 4:8
Tx bands				

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

**Transfer function of Filter 2****Transfer function of Filter 2 (wideband)**



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**References**

<b>Type</b>	B9310
<b>Ordering code</b>	B39202B9310G110
<b>Marking and package</b>	C61157-A7-A141
<b>Packaging</b>	F61074-V8152-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9310_LB_NB.s3p B9310_LB_WB.s3p B9310_UB_NB.s3p B9310_UB_WB.s3p
<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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