



## **SAW Components**

### **SAW RX filter**

GSM850 / WCDMA band V / Cellular

<b>Series/type:</b>	<b>B9456</b>
<b>Ordering code:</b>	<b>B39881B9456P810</b>
<b>Date:</b>	<b>December 07, 2009</b>
<b>Version:</b>	<b>2.0</b>



Data sheet



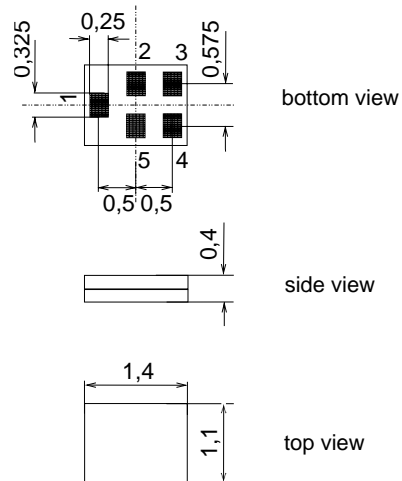
Application

- Low-loss RF filter for mobile telephone GSM850, Cellular and WCDMA band V systems, receive path (RX)
- Suitable for diversity applications
- Very high TX suppression
- Useable passband 25 MHz
- Unbalanced to balanced operation
- Impedance transformation from 50 Ω to 100 Ω
- Suitable to GPRS class 1 to 12



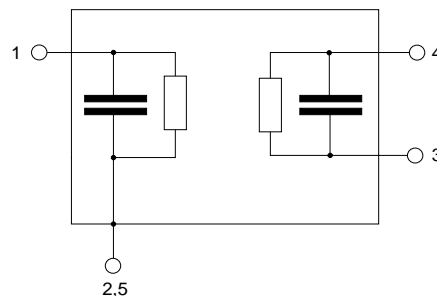
Features

- Package size 1.4 x 1.1 x 0.4 mm<sup>3</sup>
- Package code QCS51
- 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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**Characteristics**

Temperature range for specification: T = -30 °C to +85 °C  
 Terminating source impedance: Z<sub>S</sub> = 50 Ω (unbalanced)  
 Terminating load impedance: Z<sub>L</sub> = 100 Ω (balanced)

						B9456			
						min.	typ. @ 25 °C	max.	
<b>Center frequency</b>			f <sub>C</sub>			—	881.5	—	MHz
<b>Maximum insertion attenuation</b>									
	869.0 ... 894.0	MHz	α <sub>max</sub>			—	2.0	2.6	dB
@f <sub>Carrier Bd V RX</sub>	871.4 ... 891.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>			—	1.7	2.3	dB
<b>Amplitude ripple (p-p)</b>									
	869.0 ... 894.0	MHz	Δα			—	0.7	1.3	dB
<b>Error Vector Magnitude<sup>2)</sup></b>									
@f <sub>Carrier Bd V RX</sub>	871.4 ... 891.6	MHz	EVM			—	2.0	3.2	%
<b>Input VSWR</b>									
	869.0 ... 894.0	MHz				—	1.6	2.0	
<b>Output VSWR</b>									
	869.0 ... 894.0	MHz				—	1.6	2.0	
<b>Output amplitude balance ( S<sub>31</sub>/S<sub>21</sub> )</b>									
	869.0 ... 894.0	MHz				- 1	-0.5/0.3	+ 1	dB
<b>Output phase balance (φ(S<sub>31</sub>)-φ(S<sub>21</sub>))+180°</b>									
	869.0 ... 894.0	MHz				- 8	± 5	+ 8	°
<b>Attenuation</b>			α						
	DC ... 824.0	MHz				40	60	—	dB
	824.0 ... 849.0	MHz				50	57	—	dB
@f <sub>Carrier Bd V TX</sub>	826.4 ... 846.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>			55	59	—	dB
	849.0 ... 854.0	MHz				10	55	—	dB
	914.0 ... 954.0	MHz				24 <sup>3)</sup>	29	—	dB
	954.0 ... 979.0	MHz				28	55	—	dB
	979.0 ... 1693.0	MHz				35	48	—	dB
	1693.0 ... 2607.0	MHz				40	60	—	dB
	1850.0 ... 1910.0	MHz				50	60	—	dB
	2607.0 ... 2682.0	MHz				45	50	—	dB
	2682.0 ... 4345.0	MHz				40	60	—	dB
	4345.0 ... 6000.0	MHz				45	60	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (4).  
 2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.  
 3) -20/85 °C



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**Annotation for characteristics section**

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

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

$f_{Carrier}$  according to 3GPP TS 25.101 (e.g. for band V RX passband,  $f_{Carrier}$  ranges from 871.4 MHz (lowest RX channel) to 891.6 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:

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

**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>	100 <sup>1)</sup>	V	machine model, 10 pulses
Input power	P <sub>IN</sub>	19	dBm	10000h, 55°C

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



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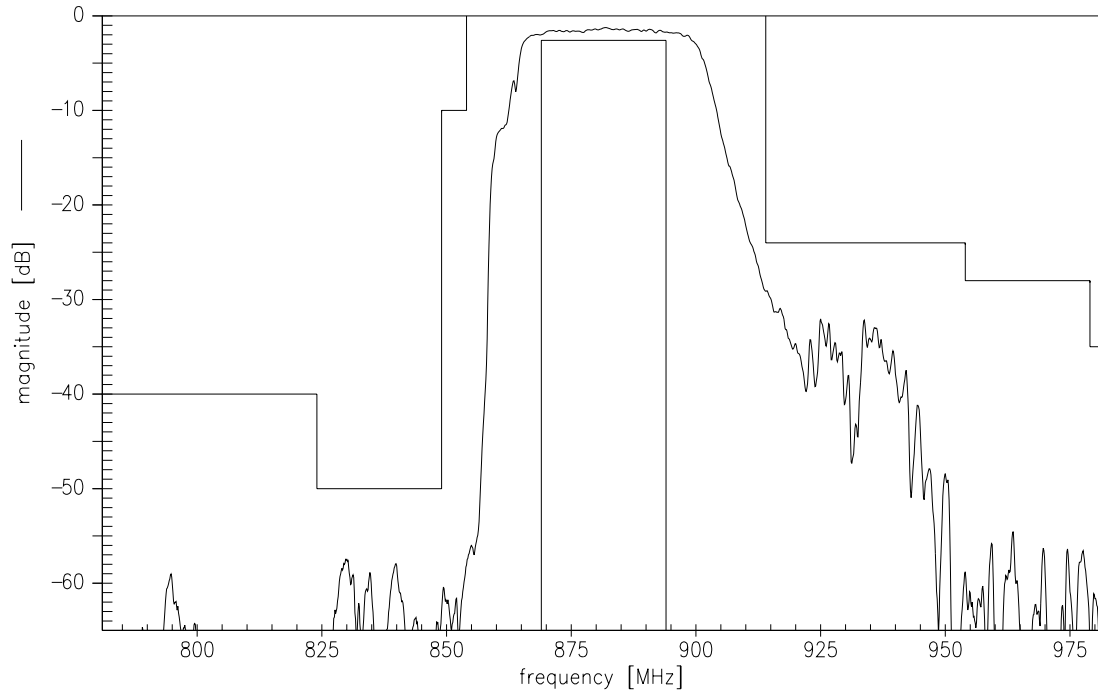
SAW RX filter

881.5 MHz

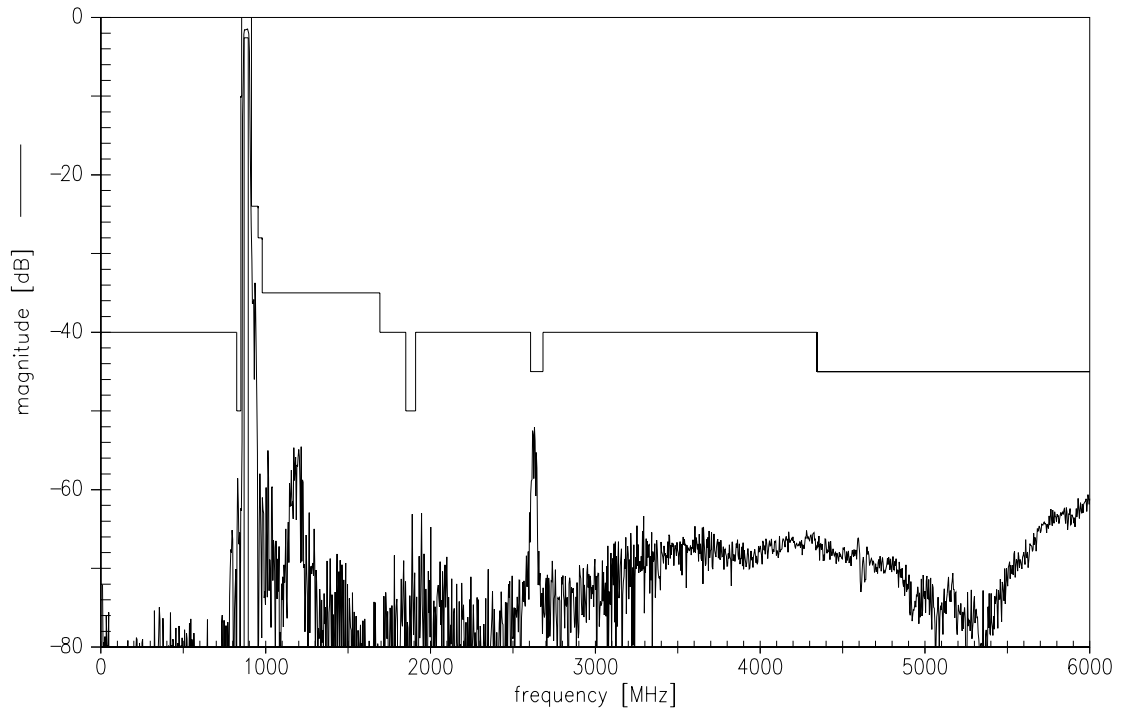
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Transfer function



Transfer function (wideband)



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

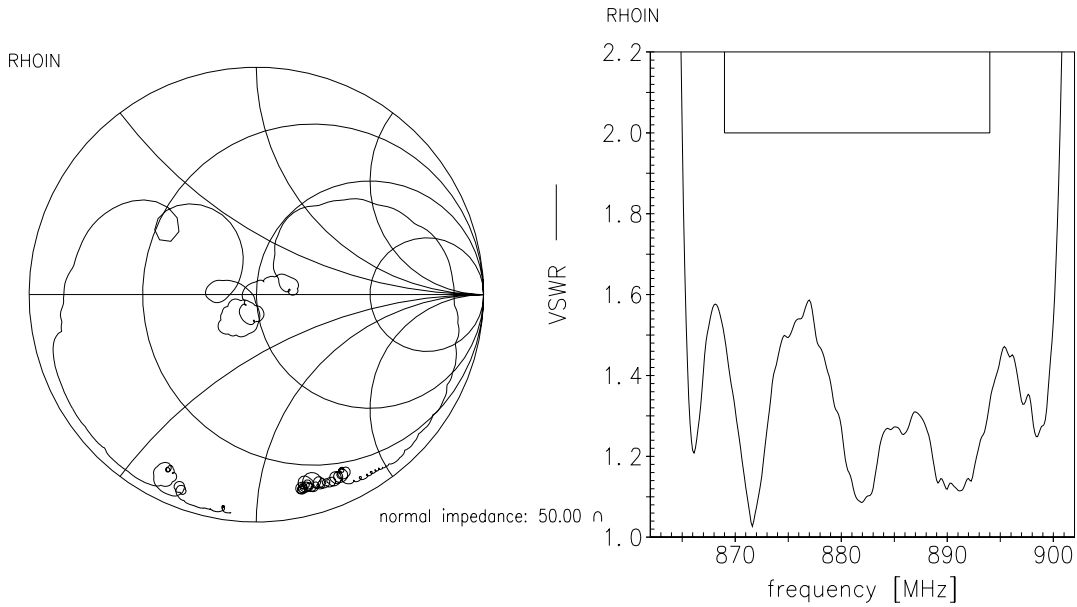


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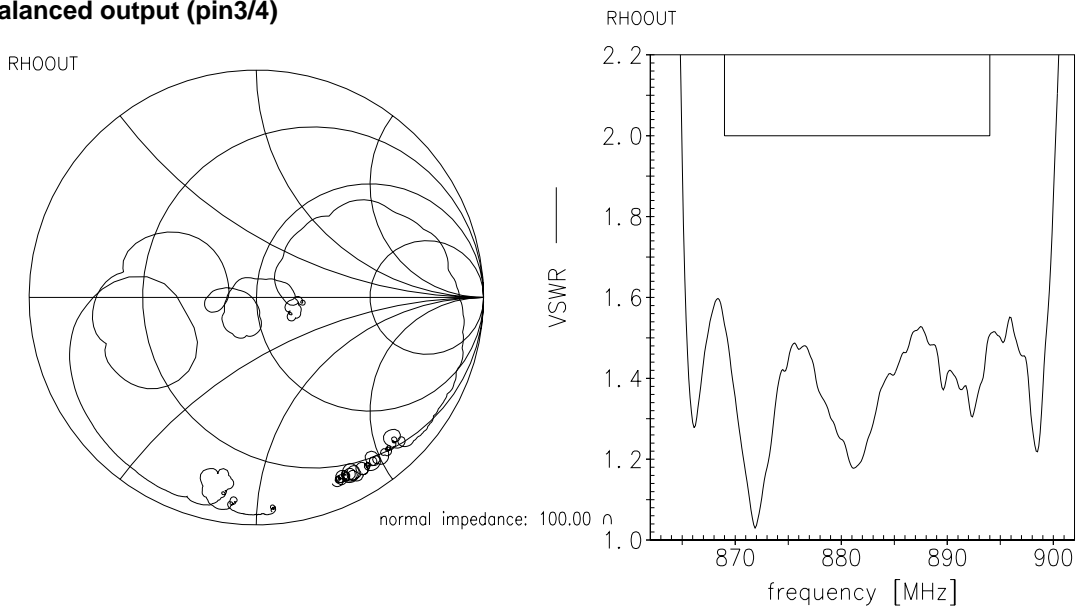


Smith charts

Unbalanced input (pin1)



Balanced output (pin3/4)





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## References

<b>Type</b>	B9456
<b>Ordering code</b>	B39881B9456P810
<b>Marking and package</b>	C61157-A8-A3
<b>Packaging</b>	F61074-V8237-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9456_NB.s2p B9456_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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**Published by EPCOS AG  
Surface Acoustic Wave Components Division  
P.O. Box 80 17 09, 81617 Munich, GERMANY**

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