



SAW Components

SAW Rx filter

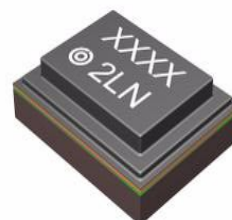
Automotive telematics

Series/type:	B4304
Ordering code:	B39941B4304F210
Date:	March 23, 2011
Version:	2.0

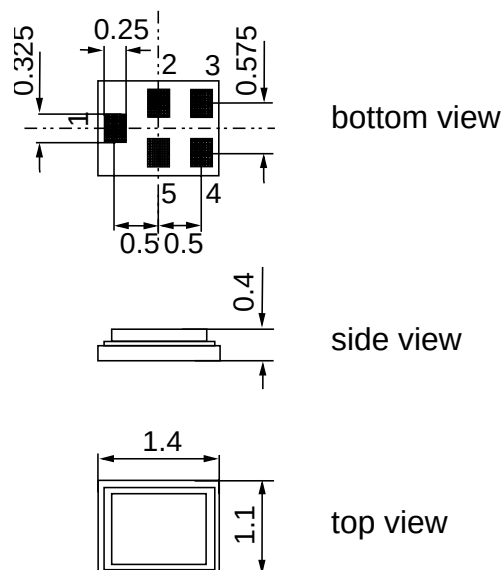
Data sheet

Application

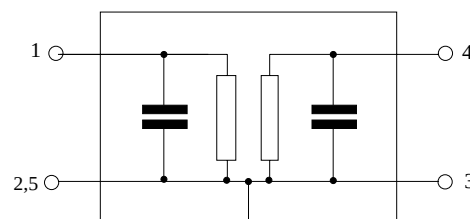
- Low-loss RF filter for mobile telephone WCDMA Band VIII and GSM 900 systems, receive path (RX)
- Very low insertion loss
- Useable passband: 35 MHz
- Unbalanced to balanced operation
- Impedance transformation from 50 Ω to 150 Ω
- Suitable for GPRS class 1 to 12


Features

- Package size 1.4 x 1.1 x 0.4 mm³
- Package code QCS5M
- RoHS compatible
- Approximate weight 0.003 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- AEC-Q200 qualified component family (operable temperature range -40°C to +85°C)
- **Electrostatic Sensitive Device (ESD)**


Pin configuration

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



Characteristics

Temperature range for specification:

 $T = -20\text{ °C to }+75\text{ °C}$

Terminating source impedance:

 $Z_S = 50\ \Omega$ (unbalanced)

Terminating load impedance:

 $Z_L = 150\ \Omega \parallel 100\text{ nH}$ (balanced)

						min.	typ. @ 25 °C	max.	
Center frequency				f_C		—	942.5	—	MHz
Maximum insertion attenuation									
	925.0	...	960.0	MHz	α_{GSM}	—	1.5	2.7	dB
@ $f_{\text{Carrier Bd 8 RX}}$	927.4	...	957.6	MHz	$\alpha_{\text{WCDMA}}^{1)}$	—	1.5	2.0	dB
Amplitude ripple (p-p)									
	925.0	...	960.0	MHz	$\Delta\alpha$	—	0.9	2.1	dB
Error Vector Magnitude²⁾									
@ $f_{\text{Carrier Bd 8 RX}}$	927.4	...	957.6	MHz	EVM	—	3.0	4.5	%
VSWR									
Input	925.0	...	960.0	MHz		—	1.9	2.2	
Output	925.0	...	960.0	MHz		—	1.9	2.2	
CMRR ($S_{21}-S_{31} / S_{21}+S_{31}$)									
	925.0	...	960.0	MHz		20 ³⁾	25	—	dB
Attenuation					α				
	DC	...	480.0	MHz		45	53	—	dB
	480.0	...	835.0	MHz		33	46	—	dB
	835.0	...	880.0	MHz		30	34	—	dB
@ $f_{\text{Carrier Bd 8 TX}}$	882.4	...	912.6	MHz	$\alpha_{\text{WCDMA}}^{1)}$	30	34	—	dB
	880.0	...	915.0	MHz	α_{GSM}	30	33	—	dB
	915.0	...	922.0	MHz		1.0	2.5	—	dB
	980.0	...	982.0	MHz		20	30	—	dB
	982.0	...	1000.0	MHz		23	30	—	dB
	1850.0	...	1920.0	MHz		40	47	—	dB
	2775.0	...	2880.0	MHz		36	41	—	dB
	3700.0	...	3840.0	MHz		38	50	—	dB
	1000.0	...	1500.0	MHz		23	32	—	dB
	1500.0	...	6000.0	MHz		23	34	—	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⁾ A CMRR of 19.6 dB corresponds to a phase imbalance of $\pm 10^\circ$ together with an amplitude imbalance of ± 1.0 dB

Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

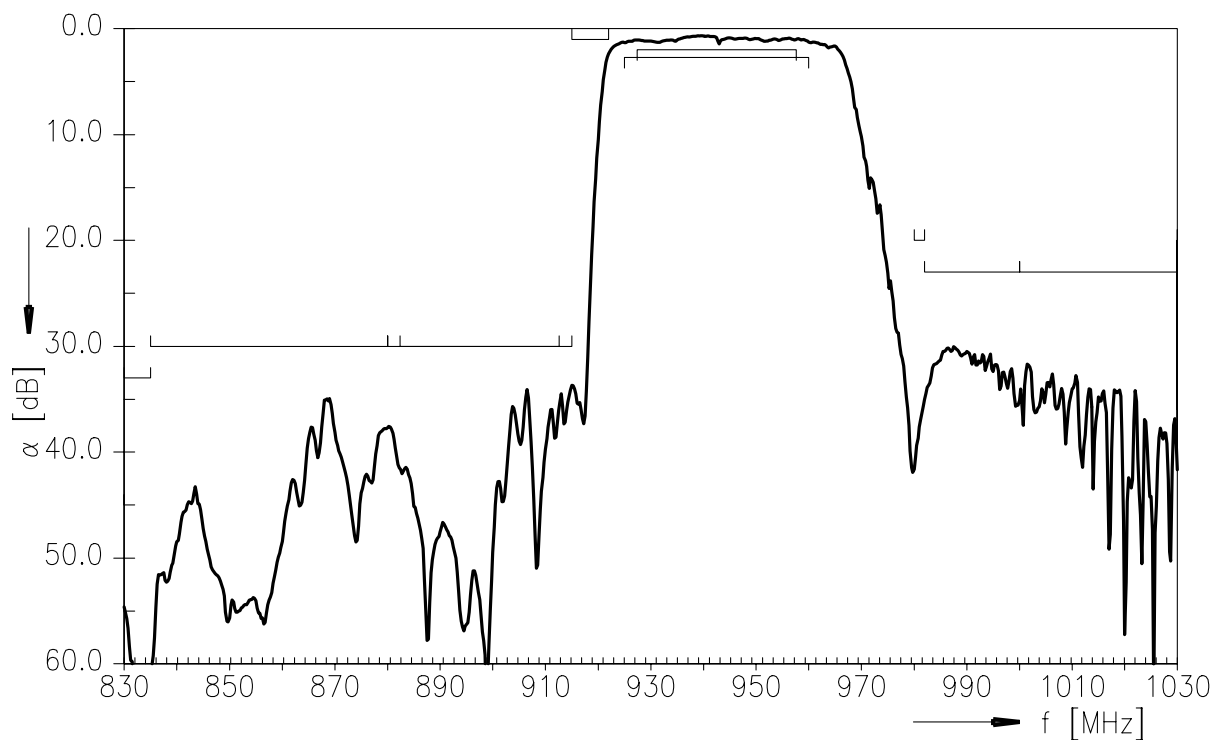
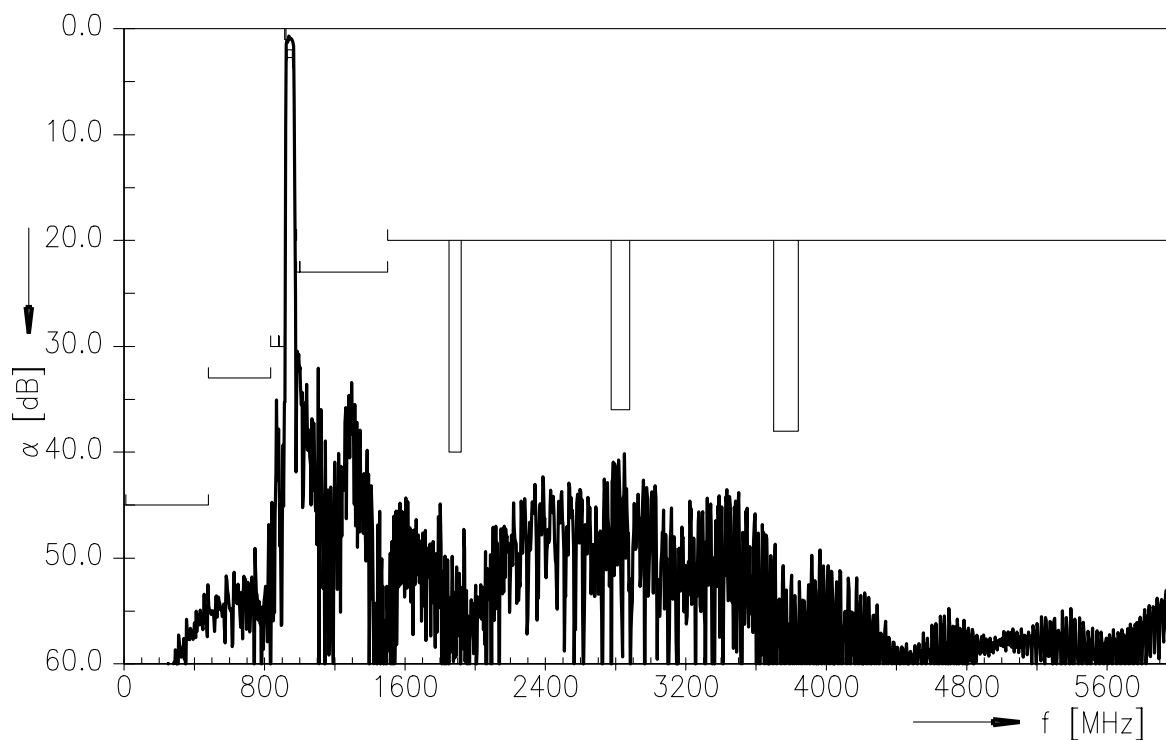
f_{Carrier} according to 3GPP TS 25.101 (e.g. for band VIII RX passband, f_{Carrier} ranges from 927.4 MHz (lowest RX channel) to 957.6 MHz (highest RX channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

Maximum ratings

Operable temperature range	T	−40/+85	°C	machine model, 10 pulses
Storage temperature range	T _{stg}	−40/+85	°C	
DC voltage	V _{DC}	0	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	
Input power	P _{IN}	13	dBm	

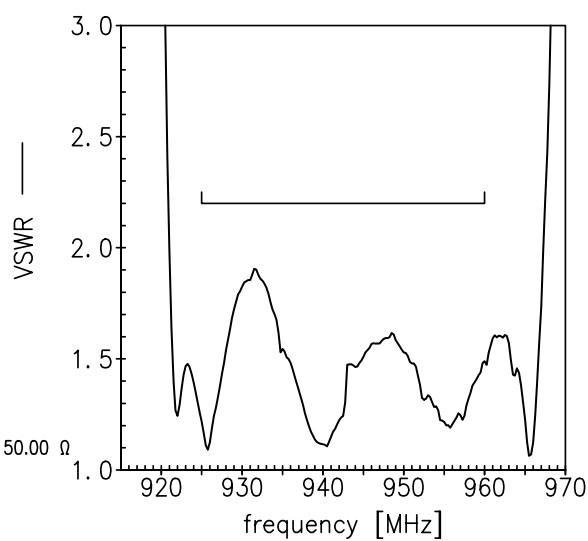
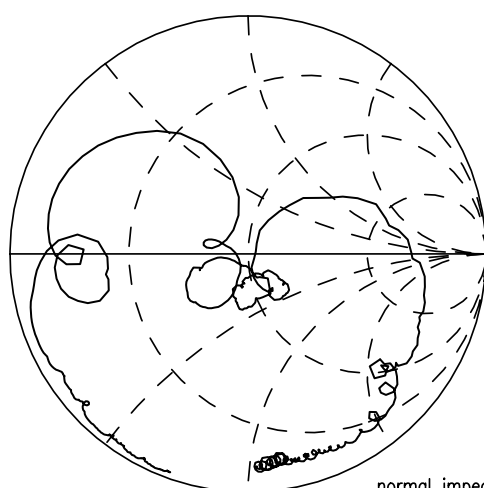
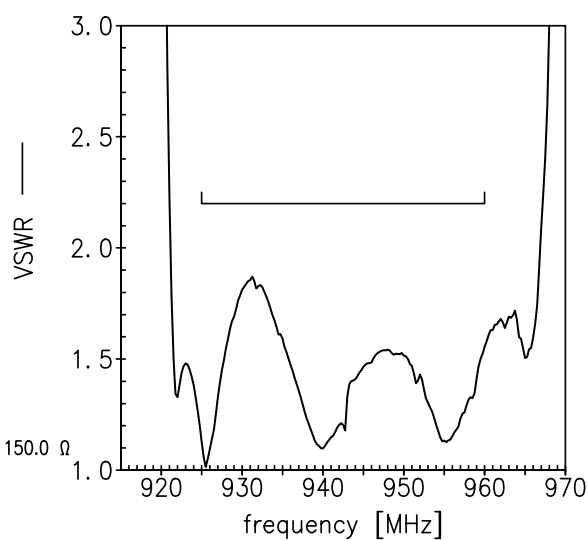
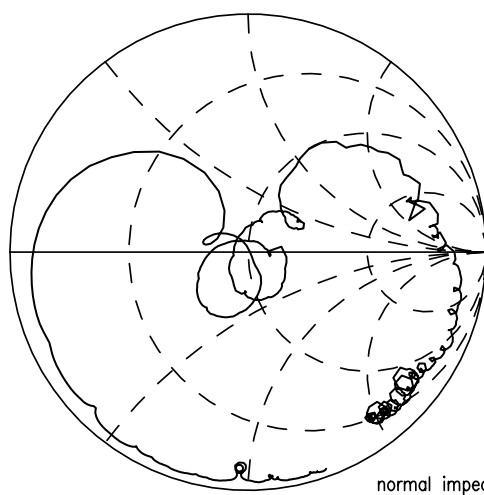
¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

Transfer function

Transfer function (wideband)


Data sheet



Smith chart

 S_{11} function

 S_{22} function


References

Type	B4304
Ordering code	B39941B4304F210
Marking and package	C61157-A8-A8
Packaging	F61074-V8212-Z000
Date codes	L_1126
S-parameters	B4304_NB.s3p, B4304_WB.s3p see file header for port/pin assignment table
Soldering profile	S_6001
RoHS compatible	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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Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm

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