



SAW Components

SAW Rx filter

Automotive telematics

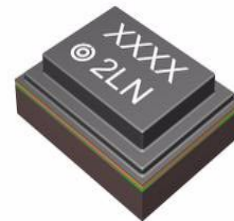
Series/type:	B4304
Ordering code:	B39941B4304F210
Date:	March 23, 2011
Version:	2.0

Data sheet



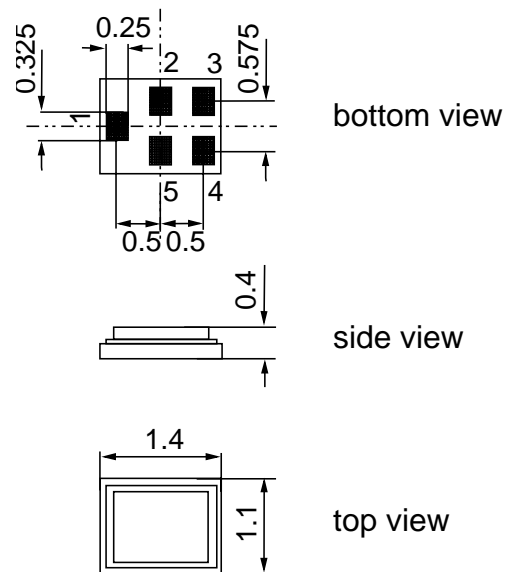
Application

- 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



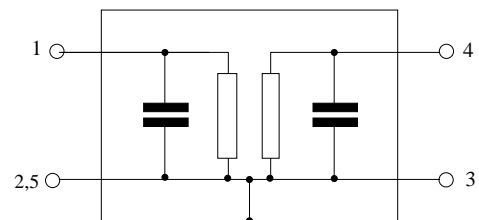
Features

- 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



Data sheet


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:

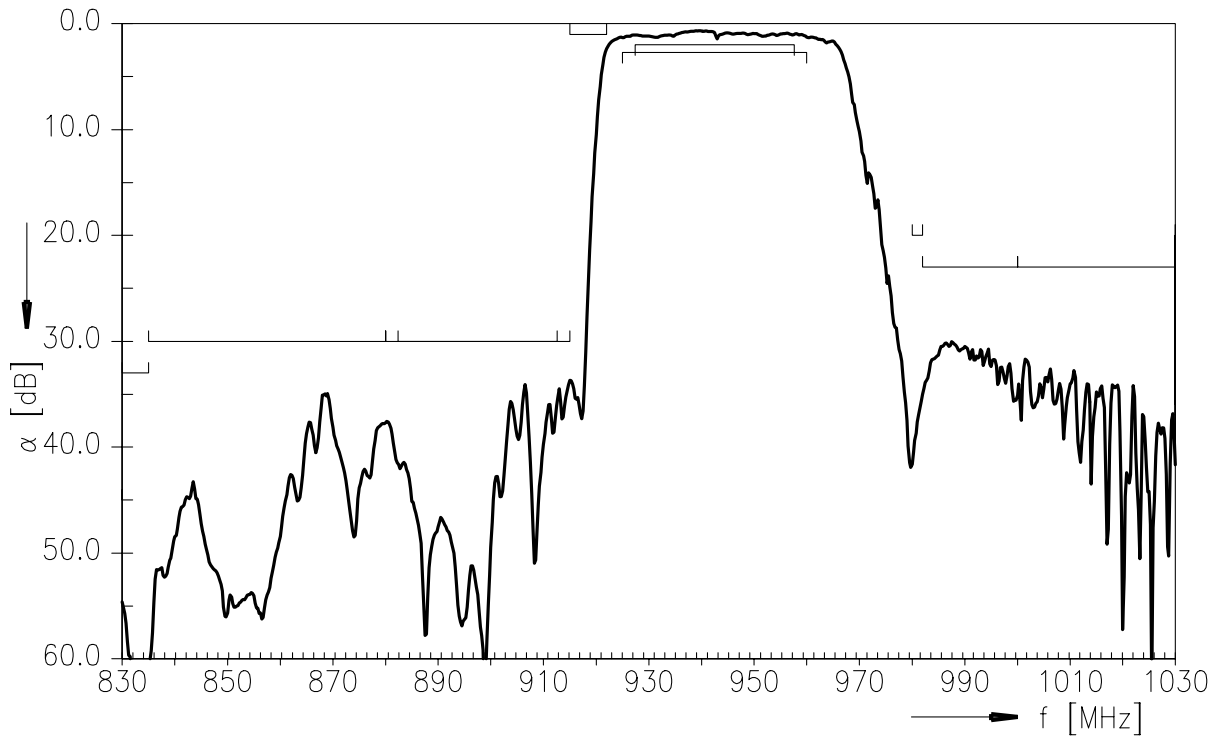
$$\int_{-\infty}^{\infty} |H_{\text{RRC}}(f)|^2 df = 1$$

Maximum ratings

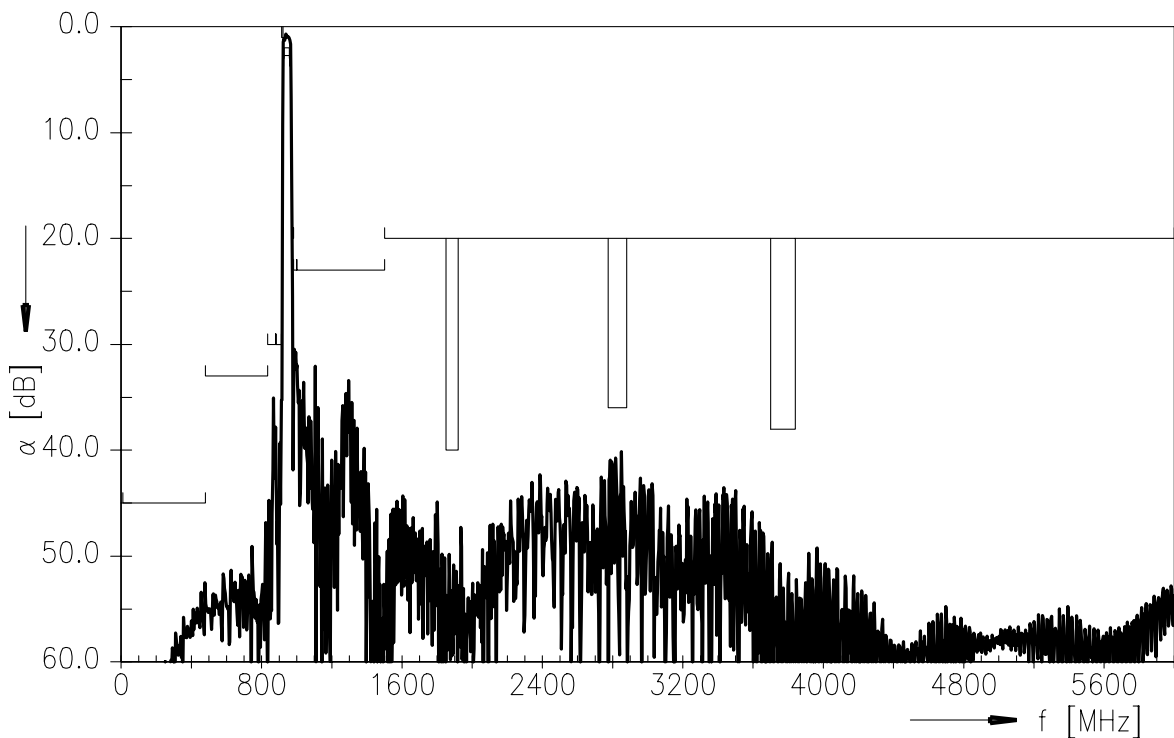
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	0	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	machine model, 10 pulses
Input power	P _{IN}	13	dBm	

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

Transfer function



Transfer function (wideband)

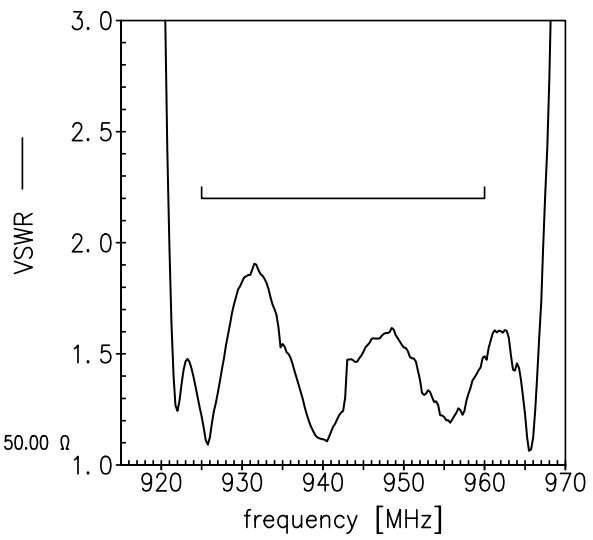
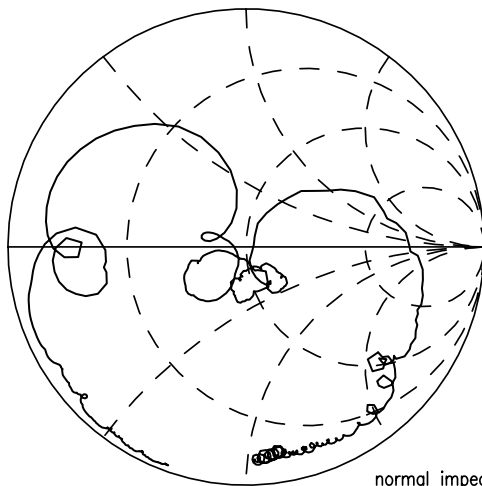


Data sheet

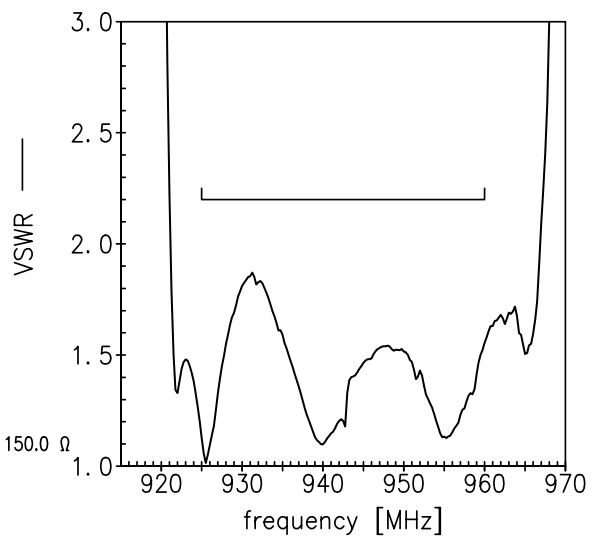
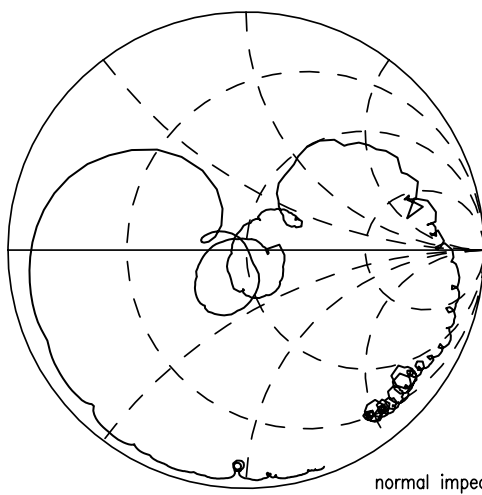


Smith chart

S₁₁ function



S₂₂ 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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
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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