



SAW Components

SAW Rx filter

Automotive telematics

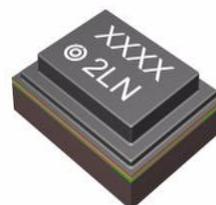
Series/type:	B4304
Ordering code:	B39941B4304F210
Date:	March 23, 2011
Version:	2.0

© EPCOS AG 2011. Reproduction, publication and dissemination of this data sheet, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.

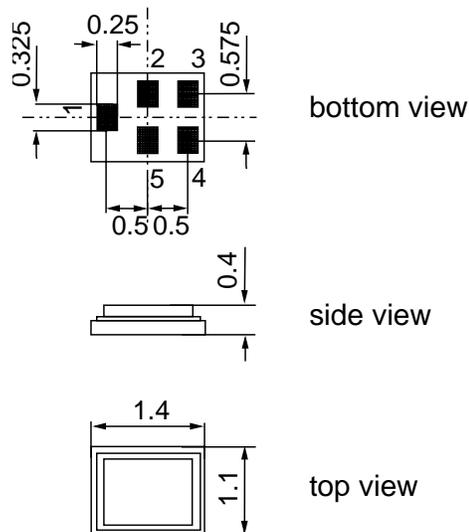
Data sheet


Application

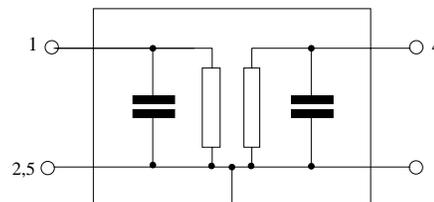
- Low-loss RF filter for mobile telephone WCDMA Band VIII and GSM 900 systems, receive path (RX)
- Very low insertion loss
- Useable passband: 35 MHz
- Unbalanced to balanced operation
- Impedance transformation from 50 Ω to 150 Ω
- Suitable for GPRS class 1 to 12


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 °C to +75 °C
Terminating source impedance:	Z _S = 50 Ω (unbalanced)
Terminating load impedance:	Z _L = 150 Ω 100 nH (balanced)

		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	942.5	—	MHz
Maximum insertion attenuation					
	925.0 ... 960.0 MHz	—	1.5	2.7	dB
@f _{Carrier Bd 8 RX}	927.4 ... 957.6 MHz	—	1.5	2.0	dB
Amplitude ripple (p-p)					
	925.0 ... 960.0 MHz	—	0.9	2.1	dB
Error Vector Magnitude²⁾					
@f _{Carrier Bd 8 RX}	927.4 ... 957.6 MHz	—	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 (S₂₁-S₃₁ / S₂₁+S₃₁)					
	925.0 ... 960.0 MHz	20 ³⁾	25	—	dB
Attenuation					
	DC ... 480.0 MHz	45	53	—	dB
	480.0 ... 835.0 MHz	33	46	—	dB
	835.0 ... 880.0 MHz	30	34	—	dB
@f _{Carrier Bd 8 TX}	882.4 ... 912.6 MHz	30	34	—	dB
	880.0 ... 915.0 MHz	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 ±10° 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:

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

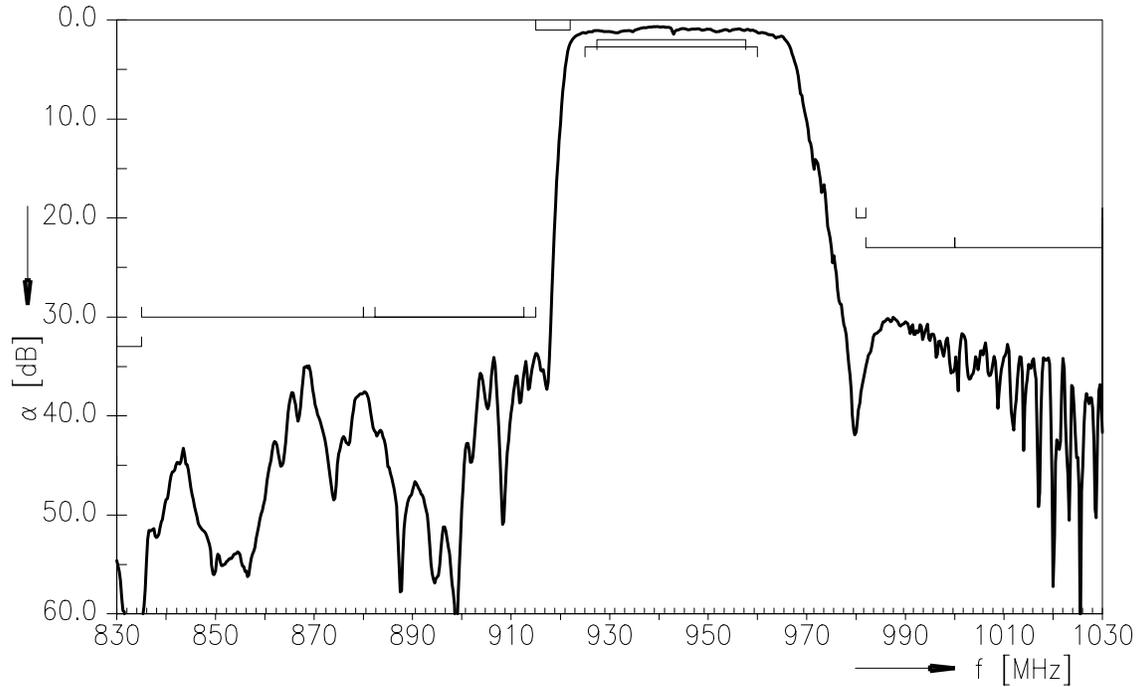
Maximum ratings

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	

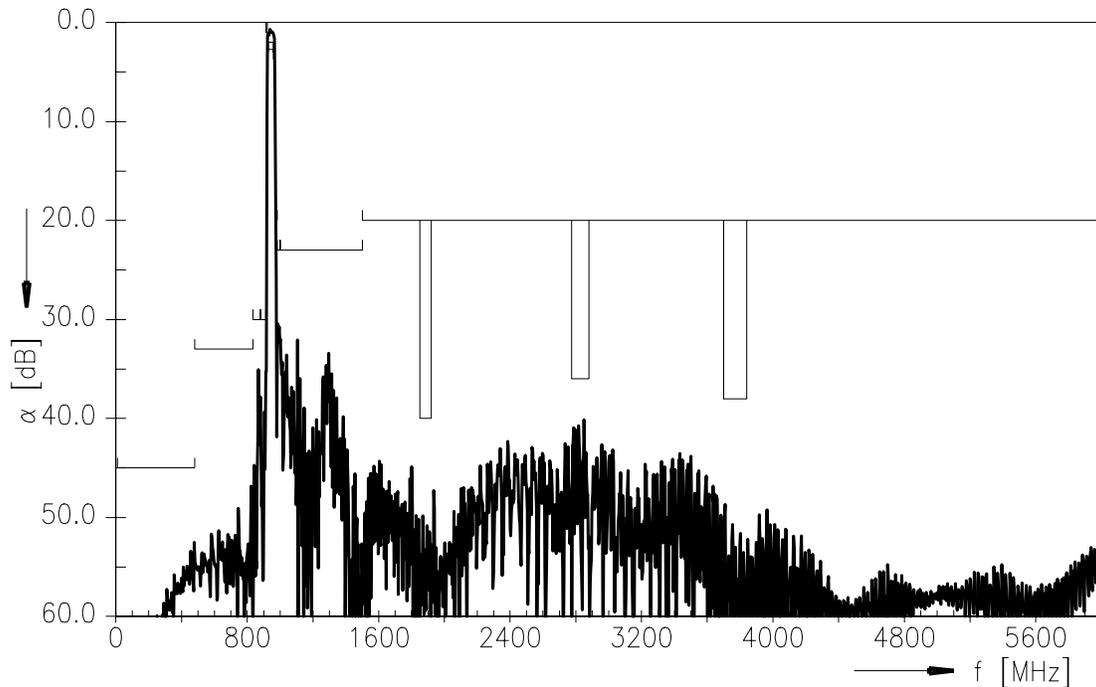
¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



Transfer function



Transfer function (wideband)

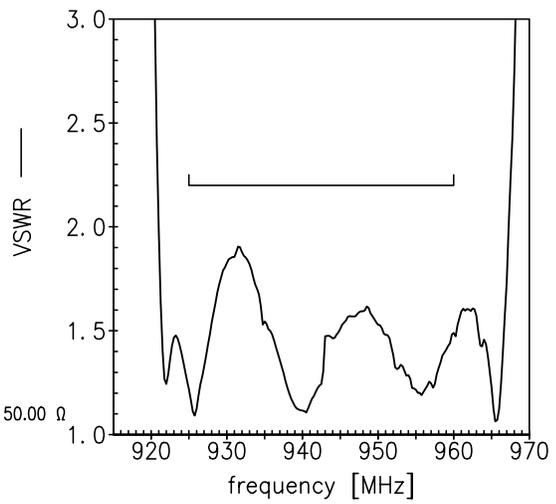
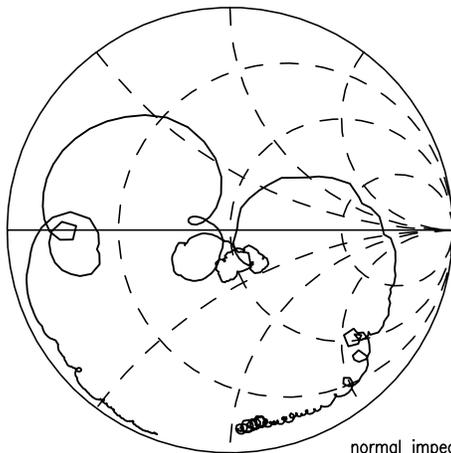


Data sheet

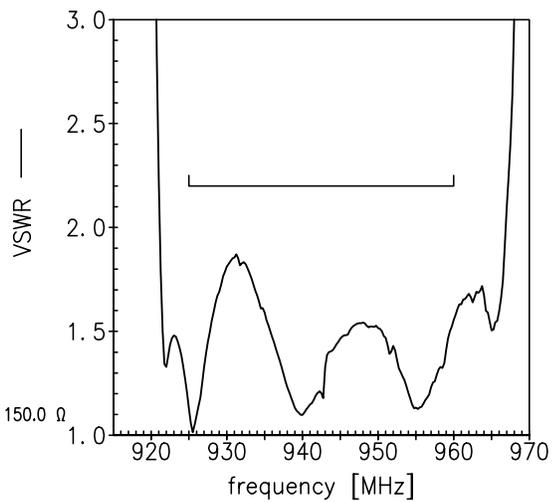
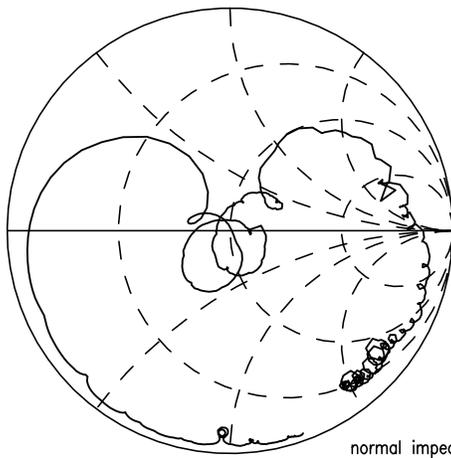


Smith chart

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."
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

For further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com .

Published by EPCOS AG
Systems, Acoustics, Waves Business Group
P.O. Box 80 17 09, 81617 Munich, GERMANY

© EPCOS AG 2011. This brochure replaces the previous edition.

For questions on technology, prices and delivery please contact the Sales Offices of EPCOS AG or the international Representatives.

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our Sales Offices.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the “General Terms of Delivery for Products and Services in the Electrical Industry” published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CSMP, CSSP, CTVS, DeltaCap, DigiSiMic, DSSP, FormFit, MiniBlue, MiniCell, MKD, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.