SAW Components

SAW RX filter

WCDMA band VIII / GSM 900

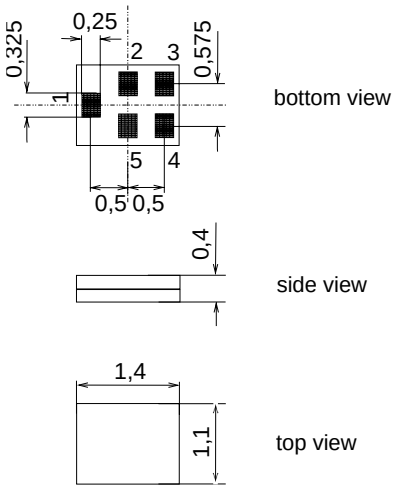
Series/type:	**B9450**
Ordering code:	**B39941B9450K610**
Date:	July 01, 2009
Version:	2.0

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

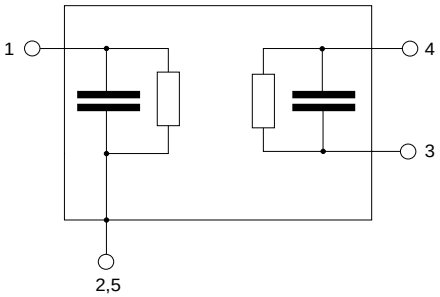
Features

- Package size 1.4 x1.1 x 0.4 mm³
- Package code QCS5F
- RoHS compatible
- Approximate weight 0.003 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

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



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 (balanced)

						B9450			
						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
@$f_{Carrier\ Bd\ 8\ RX}$	927.4	...	957.6	MHz	α_{WCDMA} [1]	—	1.4	2.0	dB
Amplitude ripple (p-p)									
	925.0	...	960.0	MHz	$\Delta\alpha$	—	0.7	2.0	dB
Error Vector Magnitude [2]									
@$f_{Carrier\ Bd\ 8\ RX}$	927.4	...	957.6	MHz	EVM	—	3.0	4.5	%
Input VSWR									
	925.0	...	960.0	MHz		—	1.7 [3]	2.0 [3]	
Output VSWR									
	925.0	...	960.0	MHz		—	1.7 [3]	2.0 [3]	
CMRR ($\lvert S_{21}-S_{31}\rvert$ / $\lvert S_{21}+S_{31}\rvert$)									
	925.0	...	960.0	MHz		20 [4]	26	—	dB
Attenuation					α				
	DC	...	480.0	MHz		45	56	—	dB
	480.0	...	835.0	MHz		30	49	—	dB
	835.0	...	880.0	MHz		30	36	—	dB
@$f_{Carrier\ Bd\ 8\ TX}$	882.4	...	912.6	MHz	α_{WCDMA} [1]	30	36	—	dB
	880.0	...	915.0	MHz	α_{GSM}	30	33	—	dB
	915.0	...	922.0	MHz		1.0	2.8	—	dB
	980.0	...	982.0	MHz		20	34	—	dB
	982.0	...	1000.0	MHz		23	30	—	dB
	1850.0	...	1920.0	MHz		40	50	—	dB
	2775.0	...	2880.0	MHz		36	40	—	dB
	3700.0	...	3840.0	MHz		38	50	—	dB
	1000.0	...	6000.0	MHz		20	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] Including serial coils of 1nH at each port. VSWR values without coils (Typ/Max): 2.0/2.2
[4] 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

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

$f_{Carrier}$ 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)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

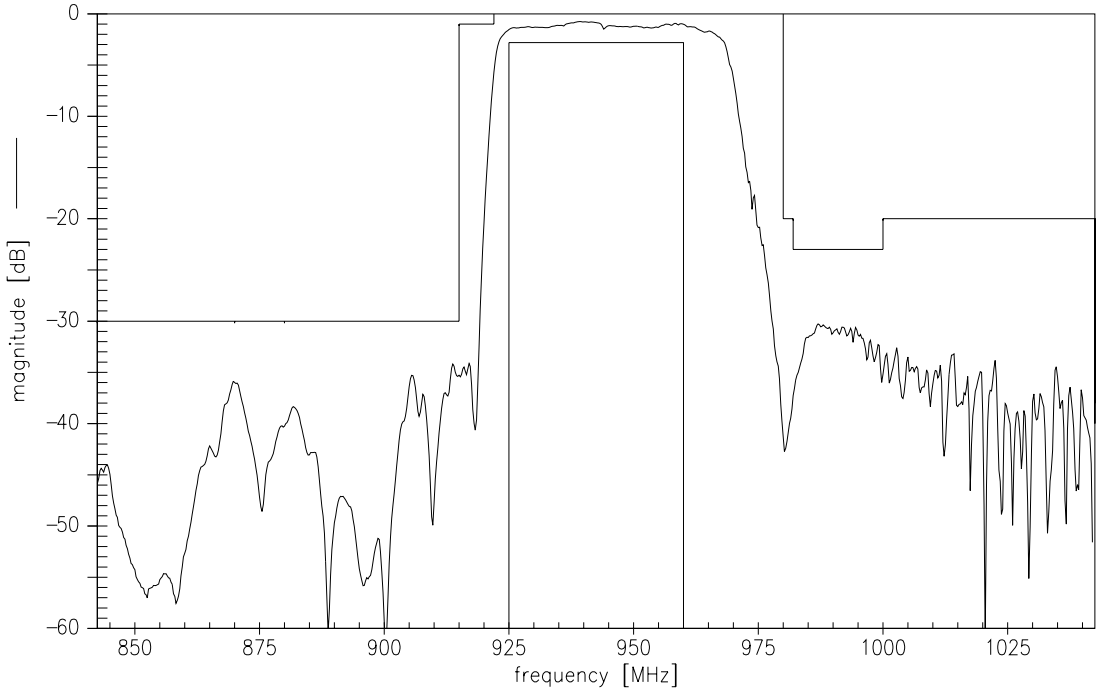
$$\int_{\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum ratings

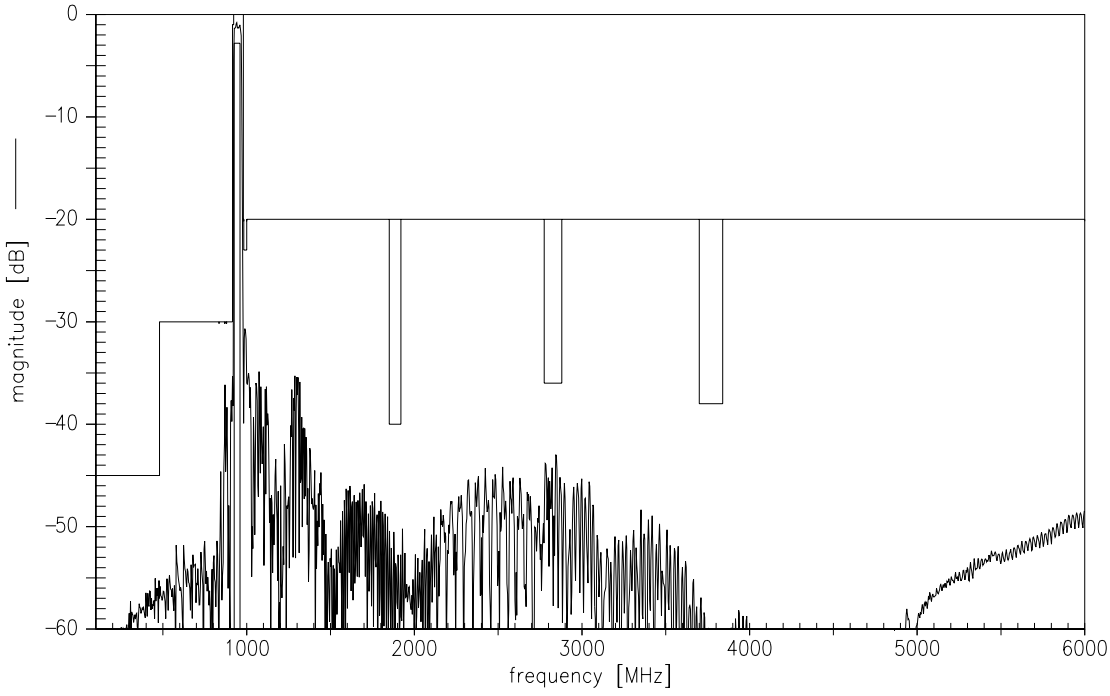
Operable temperature range	T	–40/+85	°C	
Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 10 pulses
Input power	P_{IN}	13	dBm	

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

Transfer function

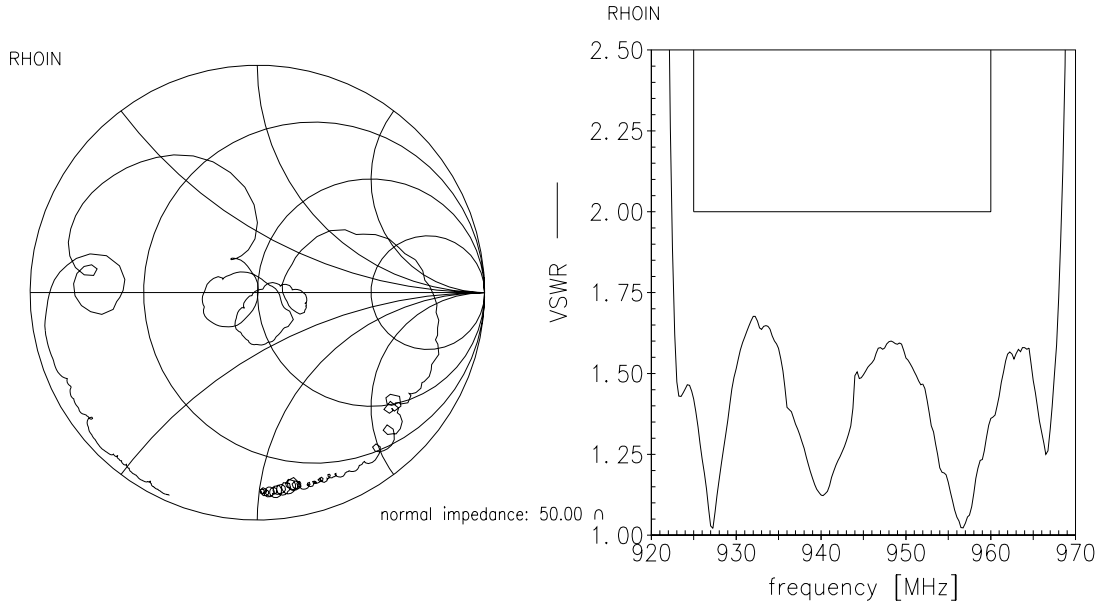


Transfer function (wideband)

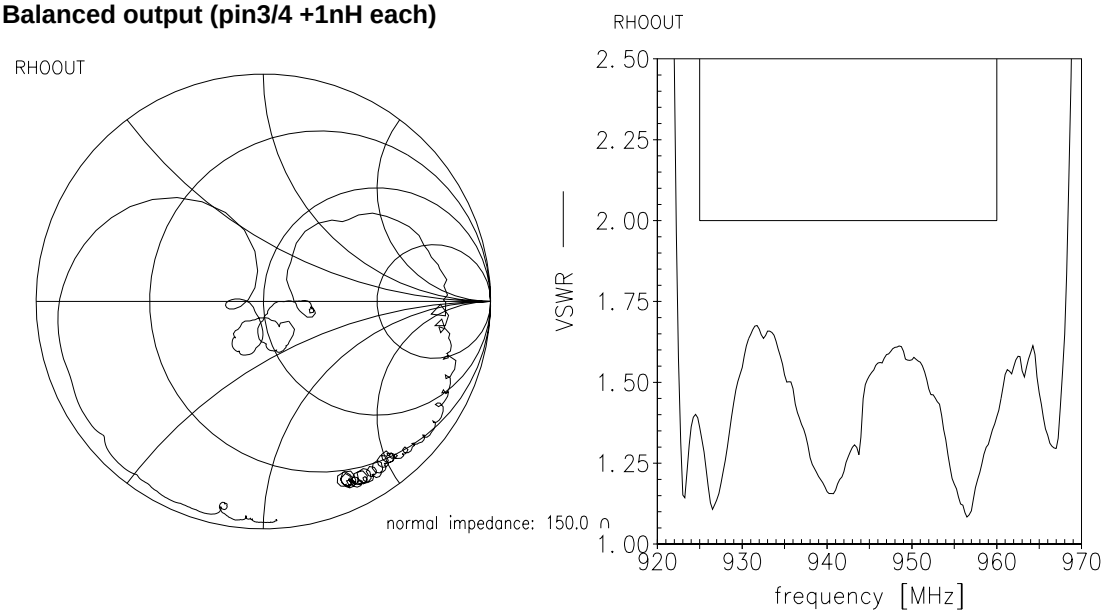


Smith charts

Unbalanced input (pin1+1nH)



Balanced output (pin3/4 +1nH each)



References

Type	B9450
Ordering code	B39941B9450K610
Marking and package	C61157-A8-A1
Packaging	F61074-V8237-Z000
Date codes	L_1126
S-parameters	B9450_NB.s2p B9450_WB.s2p 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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