SAW Components

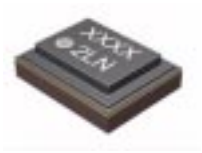
SAW TX Filter

PCS / WCDMA Band II

Series/type:	**B9640**
Ordering code:	**B39192B9640F210**
Date:	January 10, 2008
Version:	2.0

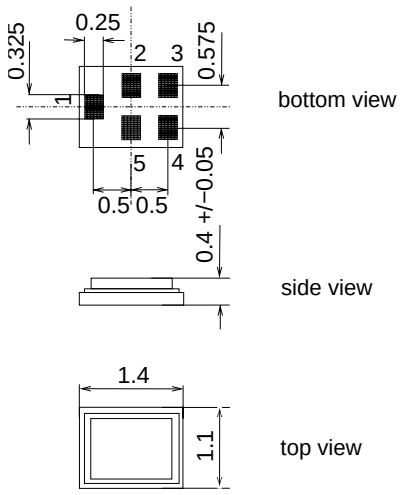
Application

- Low-loss RF filter for mobile telephone PCS and WCDMA systems, transmit path (TX)
- High selectivity
- Usable passband 60 MHz
- Impedance at input and output 50 Ω
- Unbalanced to unbalanced operation



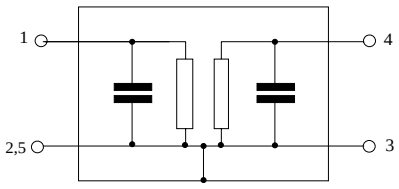
Features

- Package size 1.4 x1.1 x 0.4 mm³
- Package code QCS5M
- 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
- 4 Output unbalanced
- 2,3,5 To be grounded



Data sheet SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω + 0.3nH
Terminating load impedance: Z_L = 50 Ω + 0.3nH

				B9640[1]			
				min.	typ. @ 25 ˚C	max.	
Center frequency			f_C	—	1880.0	—	MHz
Maximum insertion attenuation							
	1850.625	...1909.375	MHz α_{max}	—	2.4	3.8[2]	dB
@$f_{Carrier}$	1852.4	...1907.6	MHz α_{WCDMA}[3]	—	2.3	3.5	dB
Amplitude ripple (p-p)							
	1850.625	...1909.375	MHz $\Delta\alpha$	—	1.1	2.9	dB
Error Vector Magnitude[4]							
@$f_{Carrier}$	1852.4	...1907.6	MHz EVM	—	2.0	4.5	%
Input VSWR							
	1850.625	...1909.375	MHz	—	1.8	2.2	
Output VSWR							
	1850.625	...1909.375	MHz	—	1.9	2.2	
Attenuation			α				
	0.0	...1550.0	MHz	32	38	—	dB
	1550.0	...1580.0	MHz	35	39	—	dB
	1580.0	...1770.0	MHz	30	35	—	dB
	1770.0	...1830.0	MHz	14	24	—	dB
	1930.625	...1990.0	MHz	33[5]	36	—	dB
@$f_{Carrier}$	1932.4	...1987.6	MHz α_{WCDMA}[3]	33	36	—	dB
	1990.0	...2032.0	MHz	35	38	—	dB
	2032.0	...2500.0	MHz	35	38	—	dB
	2500.0	...3700.0	MHz	30	36	—	dB
	3700.0	...3820.0	MHz	35	50	—	dB
	3820.0	...6000.0	MHz	25	41	—	dB

1) Values in columns min, typ and max indicate the development status of the current version.
2) Valid in temperature range -30˚C to +75˚C. Guaranteed for +85˚C: 4.2dB
3) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (5).
4) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
5) Valid in temperature range -20˚C to +85˚C. Guaranteed for -30˚C: 29dB

Data sheet SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 50 Ω

				B9640[1]			
				min.	typ. @ 25 ˚C	max.	
Center frequency			f_C	—	1880.0	—	MHz
Maximum insertion attenuation							
	1850.625	...1909.375	MHz α_{max}	—	2.5	3.8[2]	dB
@$f_{Carrier}$	1852.4	...1907.6	MHz α_{WCDMA}[3]	—	2.3	3.5	dB
Amplitude ripple (p-p)							
	1850.625	...1909.375	MHz $\Delta\alpha$	—	1.2	2.9	dB
Error Vector Magnitude[4]							
@$f_{Carrier}$	1852.4	...1907.6	MHz EVM	—	2.0	4.5	%
Input VSWR							
	1850.625	...1909.375	MHz	—	2.0	2.4	
Output VSWR							
	1850.625	...1909.375	MHz	—	2.1	2.4	
Attenuation			α				
	0.0	...1550.0	MHz	32	38	—	dB
	1550.0	...1580.0	MHz	35	40	—	dB
	1580.0	...1770.0	MHz	30	36	—	dB
	1770.0	...1830.0	MHz	14	24	—	dB
	1930.625	...1990.0	MHz	33[5]	36	—	dB
@$f_{Carrier}$	1932.4	...1987.6	MHz α_{WCDMA}[3]	33	37	—	dB
	1990.0	...2032.0	MHz	35	39	—	dB
	2032.0	...2500.0	MHz	35	39	—	dB
	2500.0	...3700.0	MHz	30	37	—	dB
	3700.0	...3820.0	MHz	35	52	—	dB
	3820.0	...6000.0	MHz	25	42	—	dB

1) Values in columns min, typ and max indicate the development status of the current version.
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3) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (5).
4) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
5) Valid in temperature range -20˚C to +85˚C. Guaranteed for -30˚C: 29dB

Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", α_{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 Passband, $f_{Carrier}$ ranges from 1852.4 MHz (lowest Tx channel) to 1907.6 MHz (highest Tx 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:

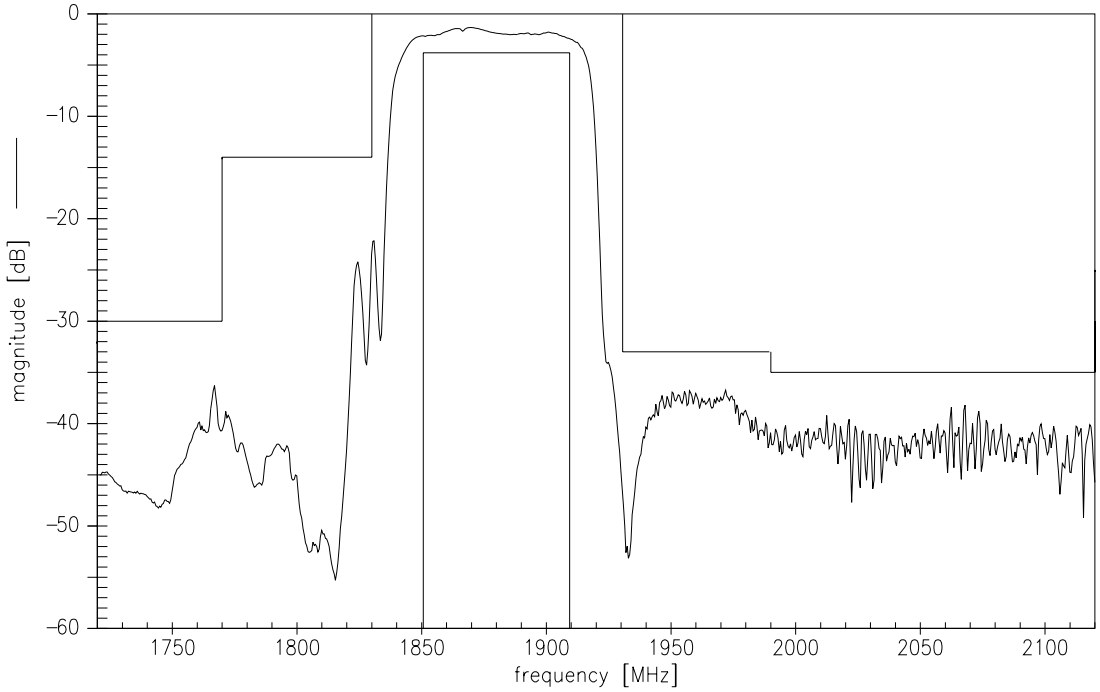
$$\int_{\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$

Maximum ratings

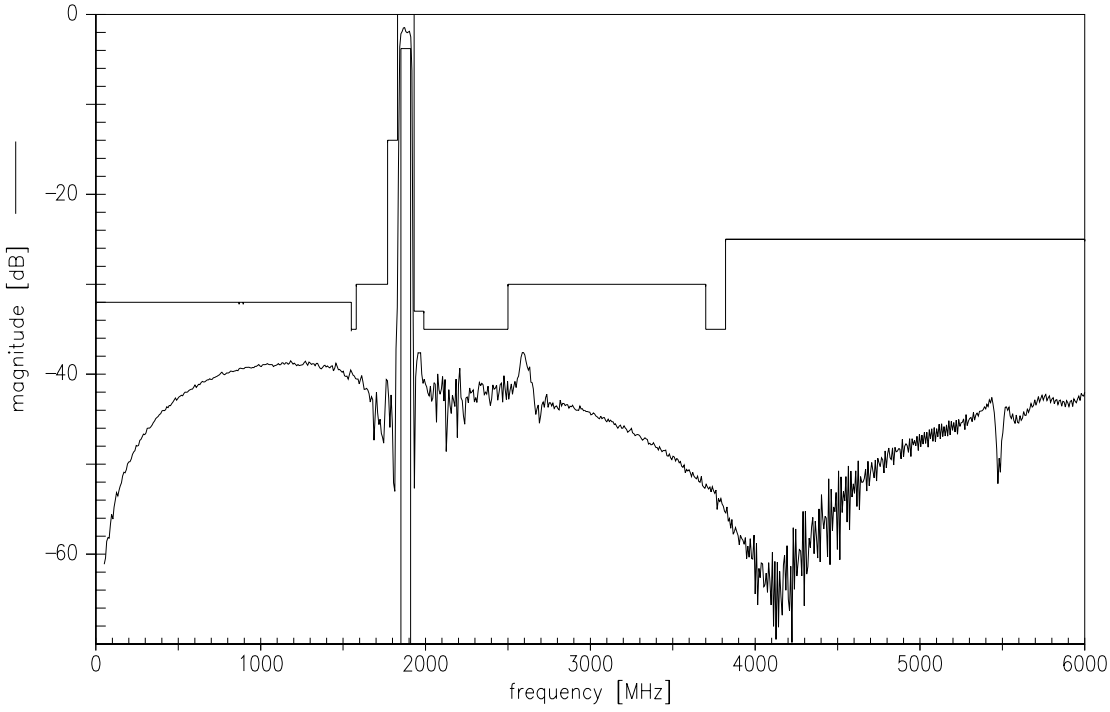
Operable temperature range	T	–40/+85	°C	
Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power	P_{IN}	15	dBm	WCDMA-Signal

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

Transfer function

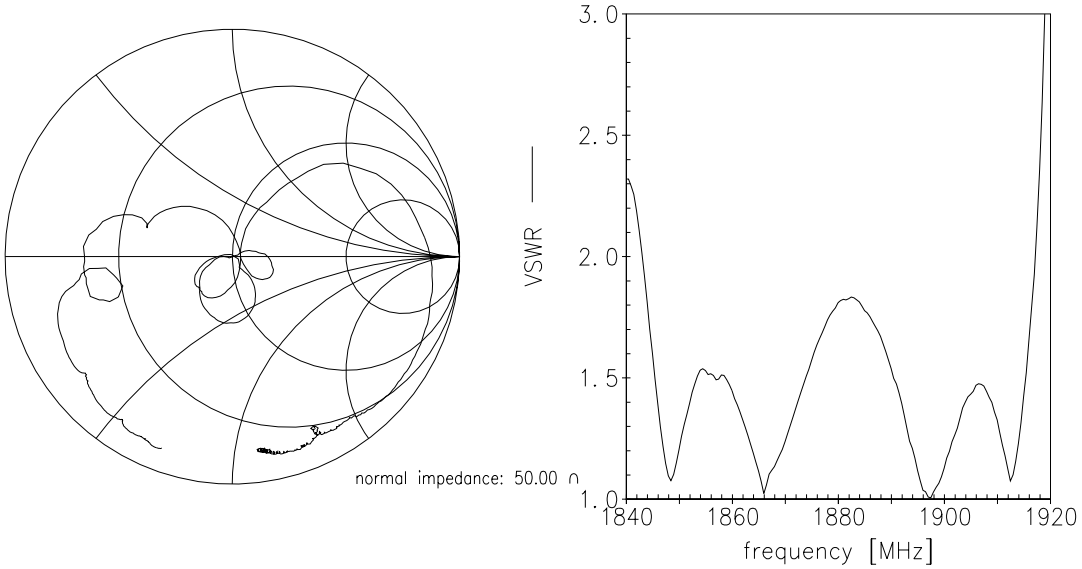


Transfer function (wideband)

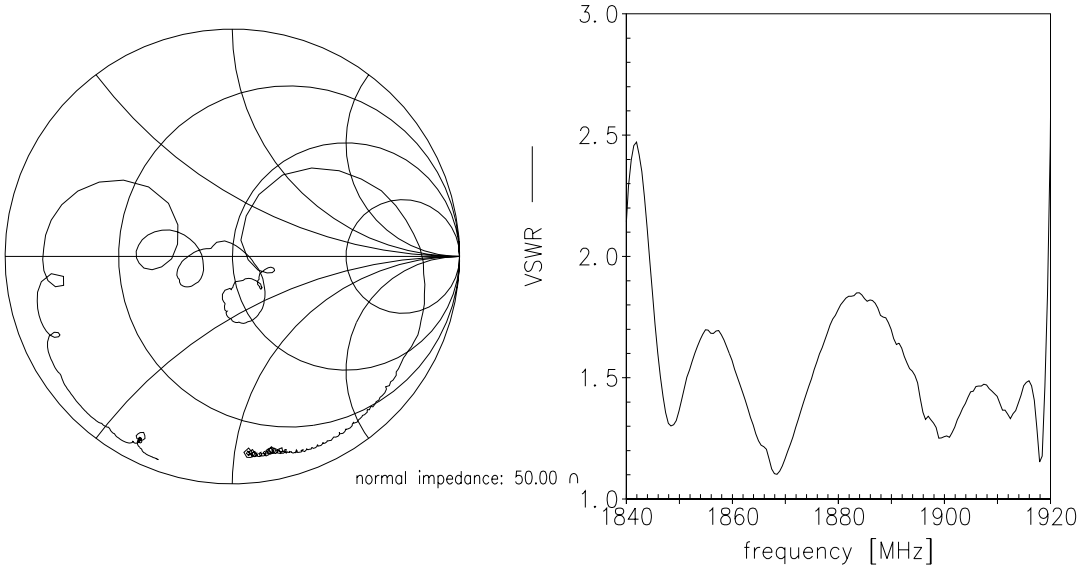


Smith charts

S_{11} function (unbalanced input with 0.3nH ser.)



S_{22} function (unbalanced output with 0.3nH ser.)



References

Type	B9640
Ordering code	B39192B9640F210
Marking and package	C61157-A8-A8
Packaging	F61074-V8212-Z000
Date codes	L_1126
S-parameters	B9640_NB.s2p B9640_WB.s2p
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.

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