



SAW Components

SAW Rx 2in1 diplex filter

GSM 1800 / GSM 1900

Series/type:	B9508
Ordering code:	B39202B9508L310
Date:	February 18, 2009
Version:	2.0



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SAW Rx 2in1 duplex filter

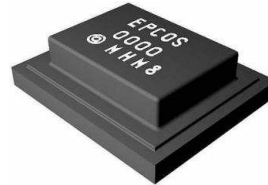
1842.5 / 1960.0 MHz

Data sheet



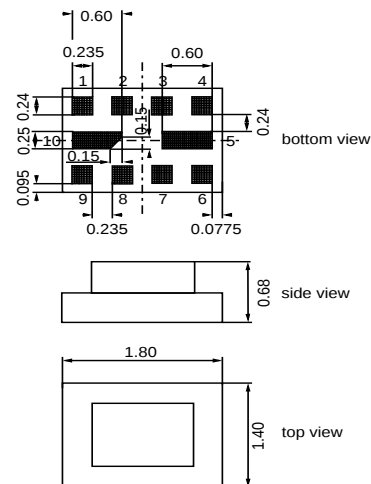
Application

- Low-loss 2in1 RF filter for mobile telephone
GSM 1800 and GSM 1900 systems, receive path (Rx)
- Usable passband:
Filter 1 (GSM 1800): 75 MHz
Filter 2 (GSM 1900): 60 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Suitable for GPRS class 1 to 12



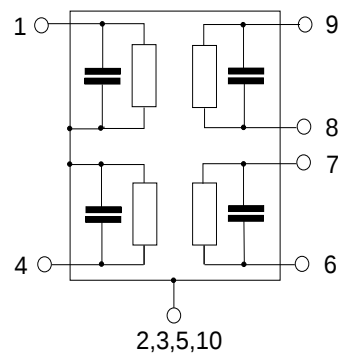
Features

- Package size 1.8 x 1.4 x 0.68 mm³
- Package code QCS10V
- RoHS compatible
- Approximate weight 0.006 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Electrostatic Sensitive Device (ESD)



Pin configuration

- 1 Input [Filter 1]
- 4 Input [Filter 2]
- 8,9 Output, balanced [Diplex]
- 6,7 To be grounded
- 2,3,5,10 Case-ground





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Characteristics of Filter 1 (GSM1800)

Temperature range for specification: $T = -20\text{ °C to }+85\text{ °C}$
Terminating source impedance: $Z_S = 50\ \Omega$
Terminating load impedance: $Z_L = 150\ \Omega \parallel 6.8\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$	—	2.3	3.2	dB
1805.0 ... 1880.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.1	1.8	dB
1805.0 ... 1880.0 MHz					
Input VSWR		—	2.0	2.3	
1805.0 ... 1880.0 MHz					
Output VSWR		—	2.0	2.3	
1805.0 ... 1880.0 MHz					
CMRR ($S_{21}-S_{31} / S_{21}+S_{31}$)		18 ¹⁾	20	—	dB
1805.0 ... 1880.0 MHz					
Attenuation	α				
0.2 ... 902.0 MHz		45	61	—	dB
902.0 ... 940.0 MHz		45	58	—	dB
940.0 ... 1690.0 MHz		27	37	—	dB
1690.0 ... 1705.0 MHz		27	35	—	dB
1705.0 ... 1785.0 MHz		10	22	—	dB
1920.0 ... 1980.2 MHz		20	24	—	dB
1980.2 ... 2030.0 MHz		24	30	—	dB
2030.0 ... 2400.0 MHz		28	31	—	dB
2400.0 ... 6000.0 MHz		34	38	—	dB

¹⁾ A CMRR of 17.3dB corresponds to a phase balance of 12° together with an amplitude balance of 1.5dB



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Data sheet



Maximum ratings of Filter 1

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, 1 pulse
Input power at				
GSM850, GSM900	P _{IN}	15	dBm	effective power in the on-state,
GSM1800, GSM1900	P _{IN}	15	dBm	duty cycle 4:8
Tx bands				

¹⁾ acc. to JEESD22-A115A (machine model), 1 negative & 1 positive pulse.



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B9508

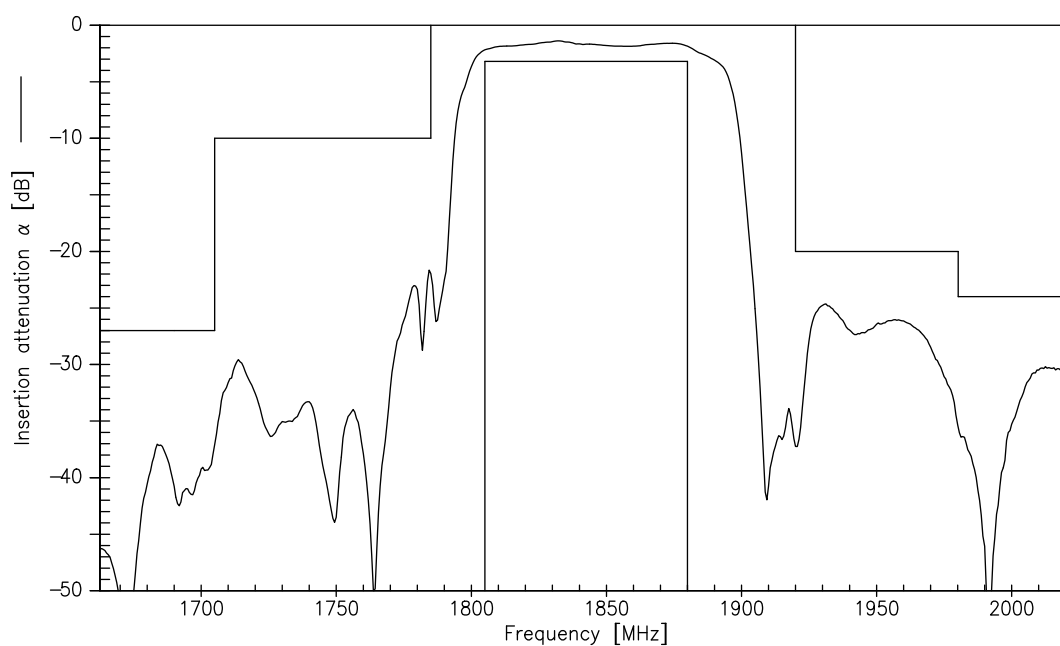
SAW Rx 2in1 duplex filter

1842.5 / 1960.0 MHz

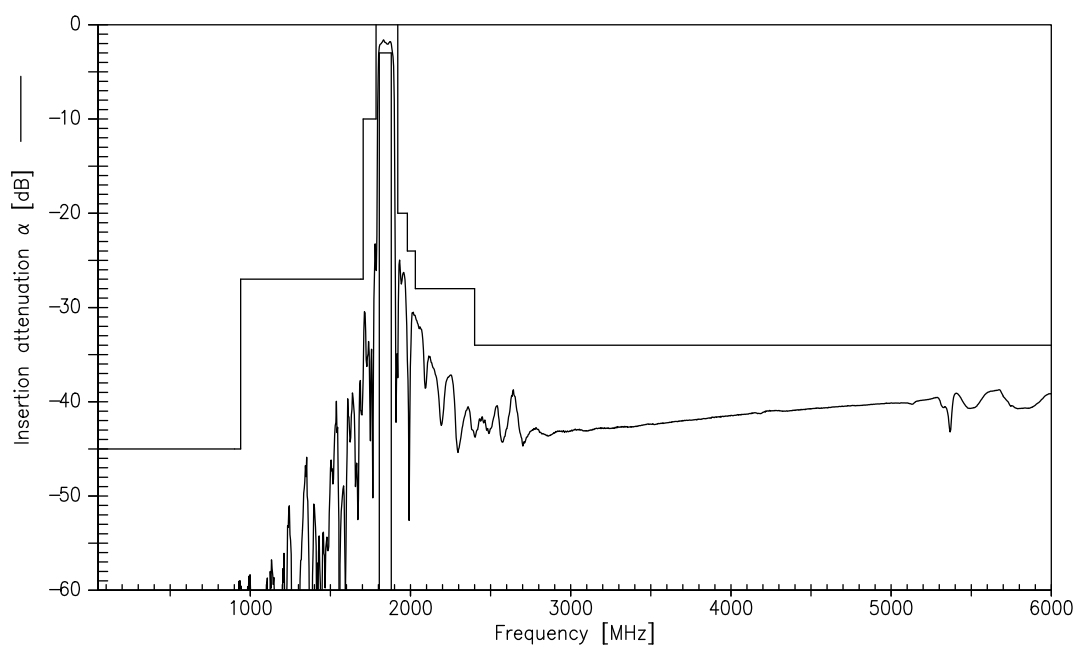
Data sheet



Transfer function Filter 1 (GSM1800)



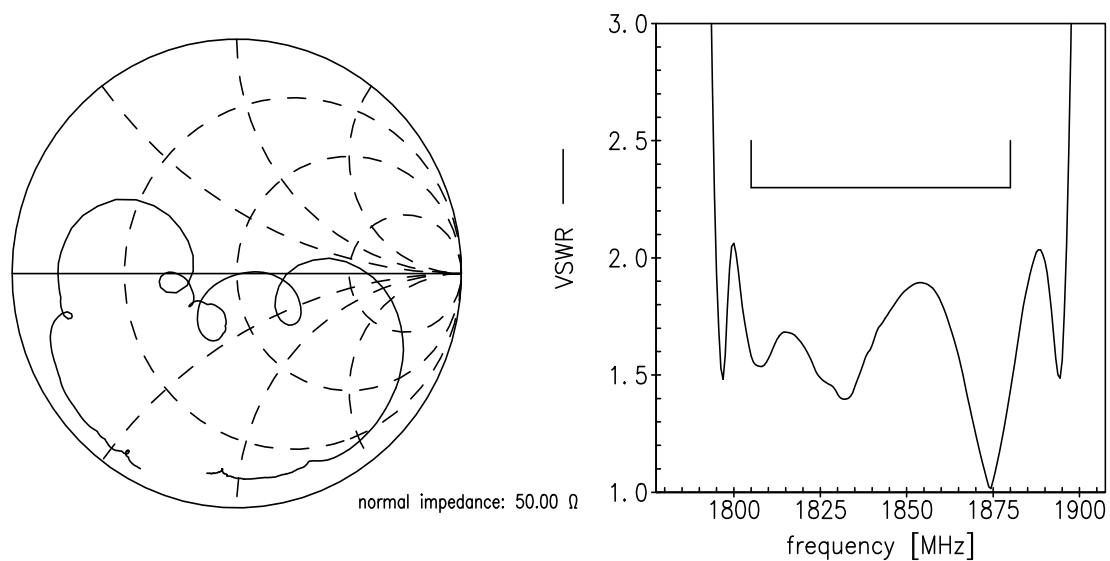
Transfer function Filter 1 (GSM1800) - Wideband



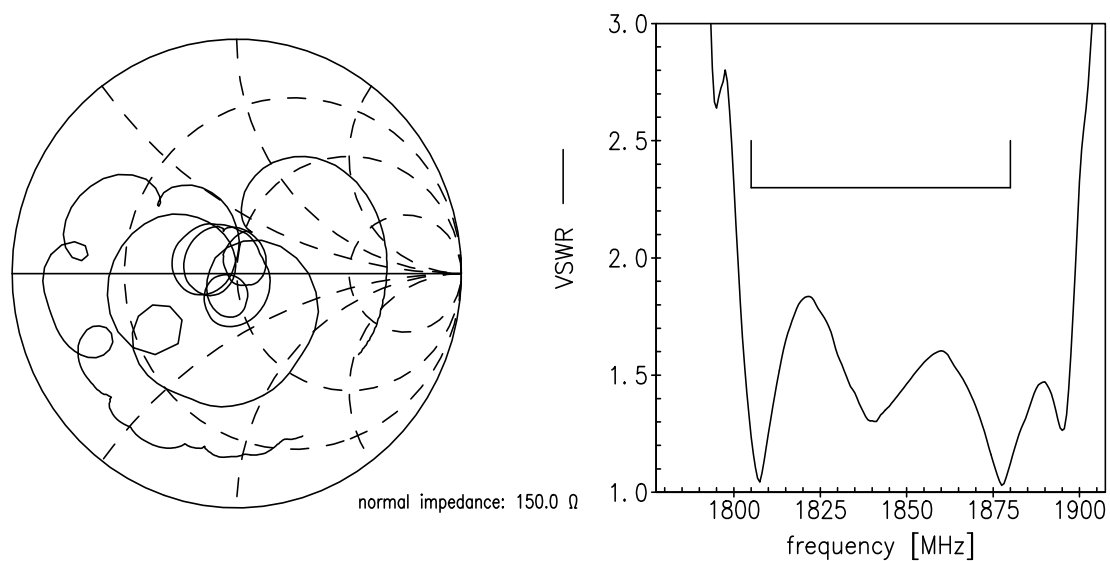
Please read cautions and warnings and important notes at the end of this document.

Smith charts Filter 1 (GSM1800)

S_{11} function



S_{22} function





SAW Components

B9508

SAW Rx 2in1 duplex filter

1842.5 / 1960.0 MHz

Data sheet



Characteristics of Filter 2 (GSM1900)

Temperature range for specification: $T = -20\text{ °C to }+85\text{ °C}$
Terminating source impedance: $Z_S = 50\ \Omega$
Terminating load impedance: $Z_L = 150\ \Omega \parallel 6.8\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$				
1930.0 ... 1990.0 MHz		—	2.3	3.1	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1930.0 ... 1990.0 MHz		—	0.7	1.8	dB
Input VSWR					
1930.0 ... 1990.0 MHz		—	1.8	2.3	
Output VSWR					
1930.0 ... 1990.0 MHz		—	1.7	2.3	
CMRR ($S_{21}-S_{31} / S_{21}+S_{31}$)					
1930.0 ... 1990.0 MHz		18 ¹⁾	20	—	dB
Attenuation	α				
0.2 ... 1510.0 MHz		45	50	—	dB
1510.0 ... 1830.0 MHz		30	38	—	dB
1830.0 ... 1850.0 MHz		26	33	—	dB
1850.0 ... 1890.0 MHz		23	34	—	dB
1890.0 ... 1910.0 MHz		10	18	—	dB
2010.2 ... 2070.0 MHz		7	20	—	dB
2070.0 ... 2400.0 MHz		22	32	—	dB
2400.0 ... 6000.0 MHz		35	42	—	dB

¹⁾ A CMRR of 17.3dB corresponds to a phase balance of 12° together with an amplitude balance of 1.5dB



SAW Components	B9508
SAW Rx 2in1 duplex filter	1842.5 / 1960.0 MHz

Data sheet



Maximum ratings of Filter 2

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, 1 pulse
Input power at				
GSM850, GSM900	P _{IN}	15	dBm	effective power in the on-state,
GSM1800, GSM1900	P _{IN}	15	dBm	duty cycle 4:8
Tx bands				

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



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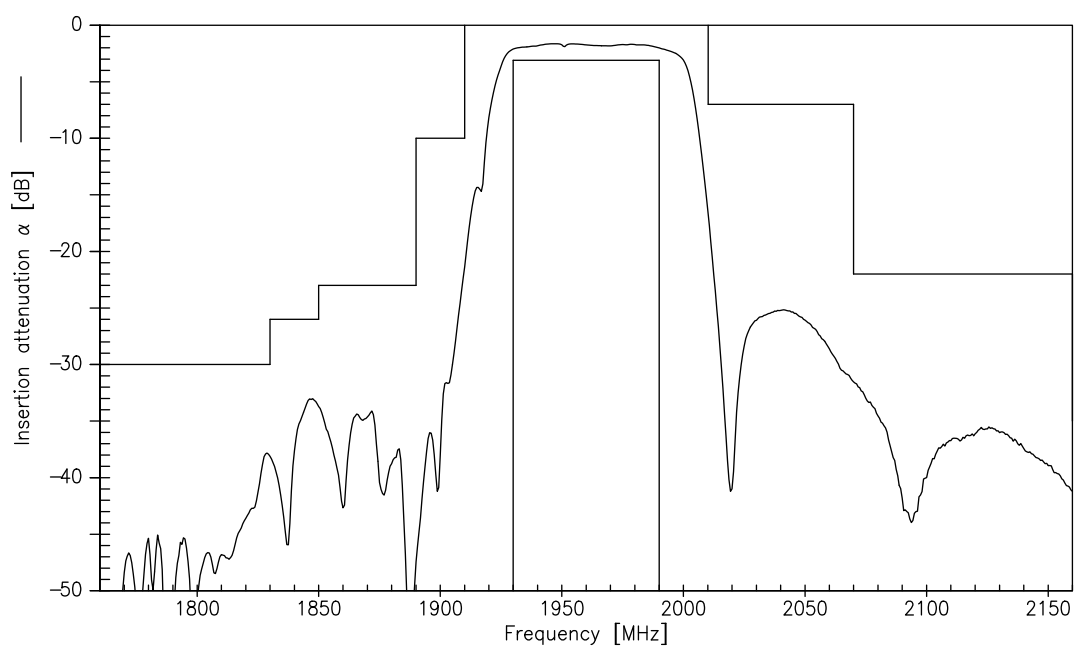
SAW Rx 2in1 duplex filter

1842.5 / 1960.0 MHz

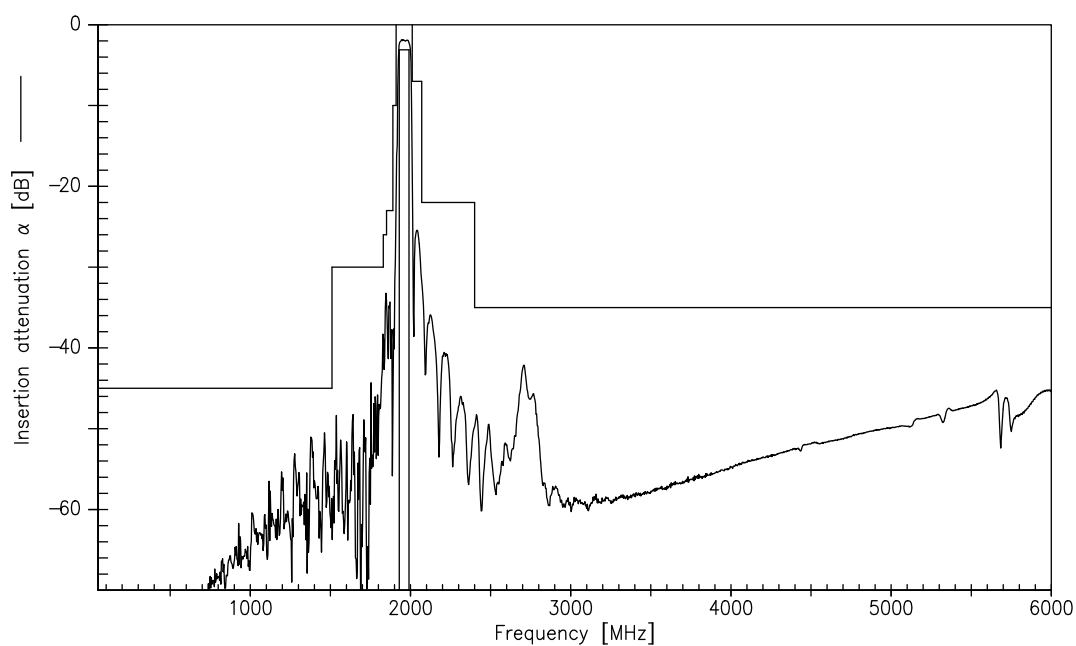
Data sheet



Transfer function Filter 2 (GSM1900)



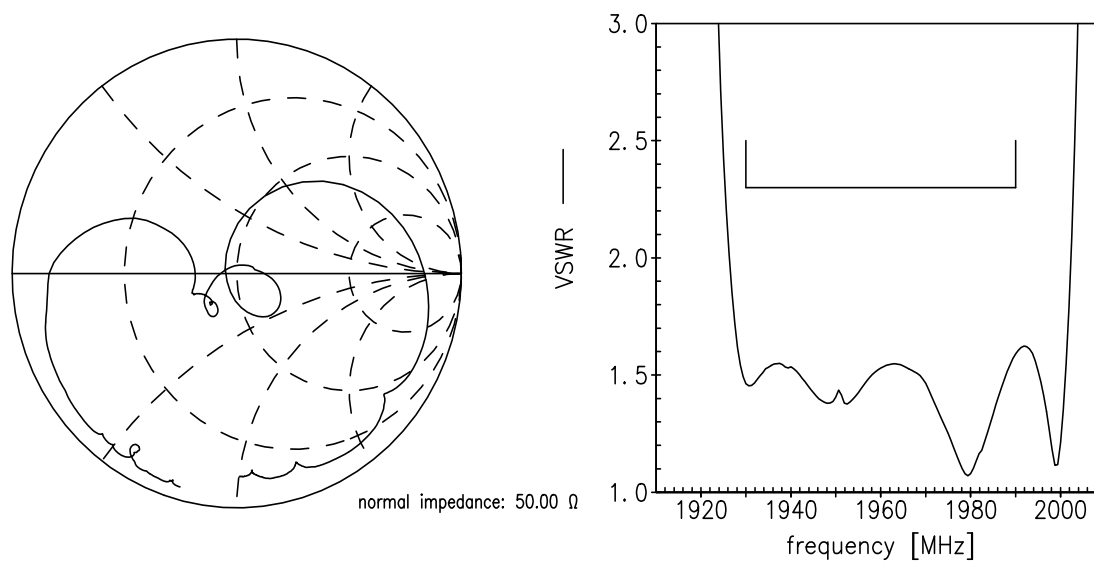
Transfer function Filter 2 (GSM1900) - Wideband



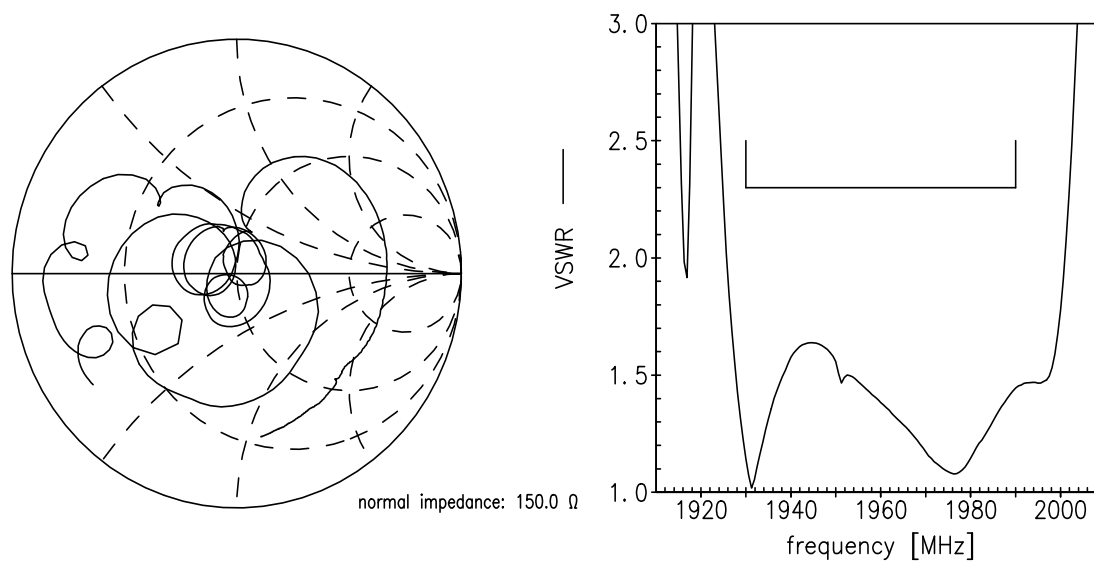
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Smith charts Filter 2 (GSM1900)

S_{11} function



S_{22} function





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Data sheet	SMD

References

Type	B9508
Ordering code	B39202B9508L310
Marking and package	C61157-A7-A153
Packaging	F61074-V8226-Z000
Date code	L_1126
S-parameters	B9508_NB.s4p B9508_WB.s4p 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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Published by EPCOS AG
Surface Acoustic Wave Components Division
P.O. Box 80 17 09, 81617 Munich, GERMANY

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