



## **SAW Components**

### **SAW Rx 2in1 filter**

**GSM 1800 / GSM 1900**

**Series/type:** **B9507**

**Ordering code:** **B39202B9507L310**

**Date:** November 04, 2008

**Version:** 2.0

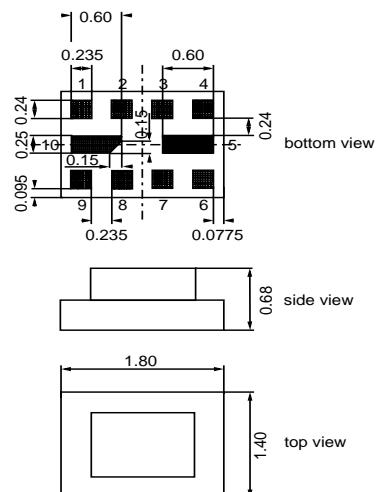
**SAW Components**
**B9507**
**SAW Rx 2in1 filter**
**1842.5 / 1960.0 MHz**
**Data sheet**

**Application**

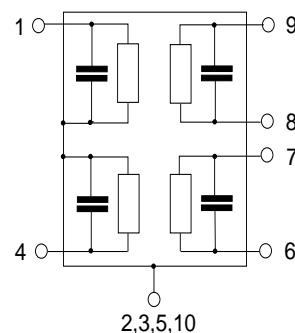
- Low-loss 2in1 RF filter for mobile telephone  
GSM 1800 and GSM 1900 systems, receive path  
(Rx)
- Usable passband:  
Filter 1 (GSM 1800): 75 MHz  
Filter 2 (GSM 1900): 60 MHz
- Unbalanced to balanced operation for all filters
- Impedance transformation from  $50 \Omega$  to  $150 \Omega$  for  
both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


**Features**

- Package size  $1.8 \times 1.4 \times 0.68 \text{ mm}^3$
- Package code QCS10V
- RoHS compatible
- Approx. weight 0.006g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**


**Pin configuration**

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



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**Characteristics of filter 1 (GSM 1800)**

Temperature range for specification:  $T = -20$  to  $+75$  °C  
 Terminating source impedance:  $Z_S = 50 \Omega$  (unbalanced)  
 Terminating load impedance:  $Z_L = 150 \Omega$  (balanced)  $\parallel 13nH$

			min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$		—	1842.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{max}$		—	1.4 <sup>1)</sup>	2.2 <sup>2)</sup>	dB
1805.0 ... 1880.0 MHz			—	0.5	1.4 <sup>3)</sup>	dB
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$		—	1.7	2.1	
1805.0 ... 1880.0 MHz			—	1.7	2.1	
<b>Input VSWR</b>			—			
1805.0 ... 1880.0 MHz			—			
<b>Output VSWR</b>			—			
1805.0 ... 1880.0 MHz			—			
<b>Output amplitude balance ( S<sub>31</sub>/S<sub>21</sub> )</b>			-1.0	-0.8/0.4	1.0	dB
1805.0 ... 1880.0 MHz						
<b>Output phase balance (φ(S<sub>31</sub>)-φ(S<sub>21</sub>))+180°</b>			-10	-5.0/5.0	10	°
1805.0 ... 1880.0 MHz						
<b>Attenuation</b>	$\alpha$					
10.0 ... 902.0 MHz			45	53	—	dB
902.0 ... 940.0 MHz			45	53	—	dB
940.0 ... 1705.0 MHz			28	40	—	dB
1705.0 ... 1785.0 MHz			12 <sup>4)</sup>	16	—	dB
1920.0 ... 1980.0 MHz			17	22	—	dB
1980.0 ... 2030.0 MHz			25	30	—	dB
2030.0 ... 2400.0 MHz			28	34	—	dB
2400.0 ... 2500.0 MHz			32	39	—	dB
2500.0 ... 2775.0 MHz			28	33	—	dB
2775.0 ... 2880.0 MHz			38	46	—	dB
2880.0 ... 3610.0 MHz			28	46	—	dB
3610.0 ... 3760.0 MHz			38	46	—	dB
3760.0 ... 5415.0 MHz			28	39	—	dB
5415.0 ... 5640.0 MHz			32	38	—	dB
5640.0 ... 6000.0 MHz			28	38	—	dB

<sup>1)</sup> Typical Value excluding PCB losses of 0.27dB

<sup>2)</sup> 2.1 dB at 25 °C

<sup>3)</sup> 1.3 dB at 25 °C

<sup>4)</sup> 14 dB at 25 °C

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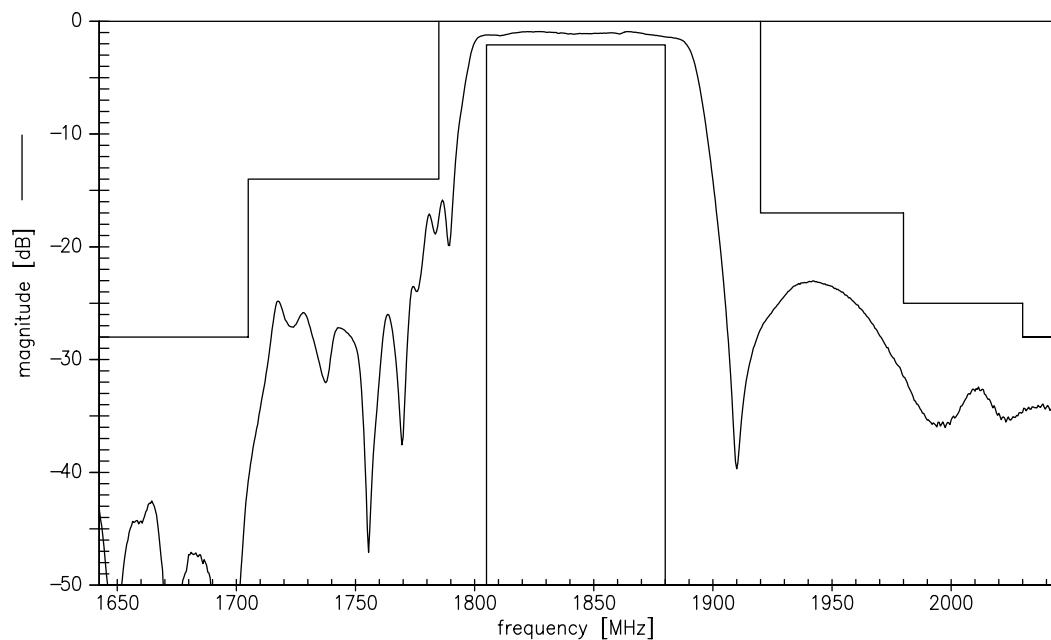
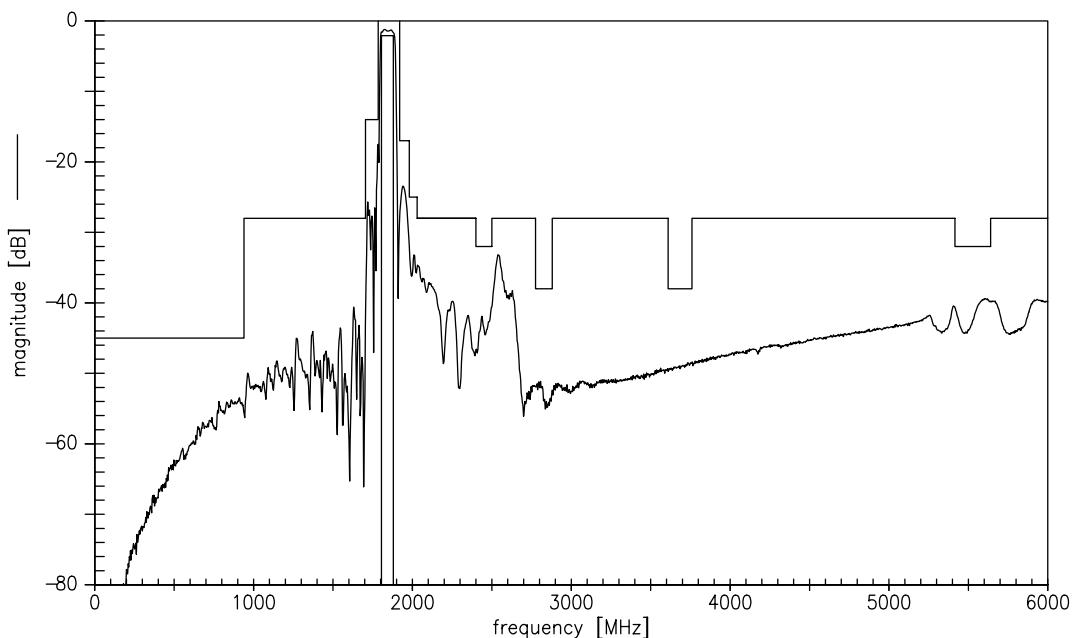
Data sheet

**Maximum ratings of filter 1**

Operable temperature range	T	-40/+85	°C	
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	50 <sup>1)</sup>	V	machine model, 1 pulse
Input power at GSM 850, GSM 900 GSM 1800, GSM 1900	P <sub>IN</sub> P <sub>IN</sub>	15 15	dBm dBm	effective power in the on-state, duty cycle 4:8
Tx bands				

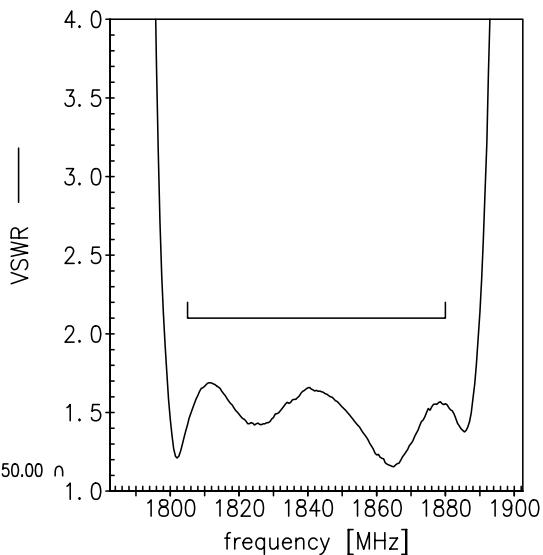
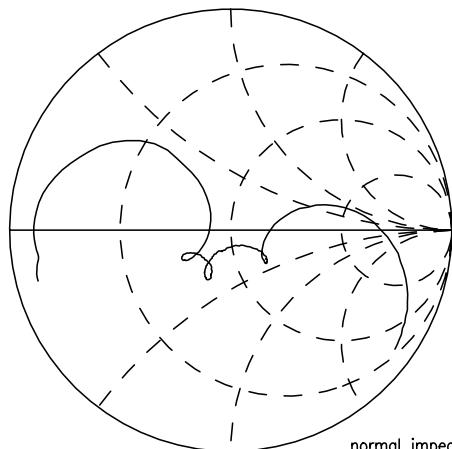
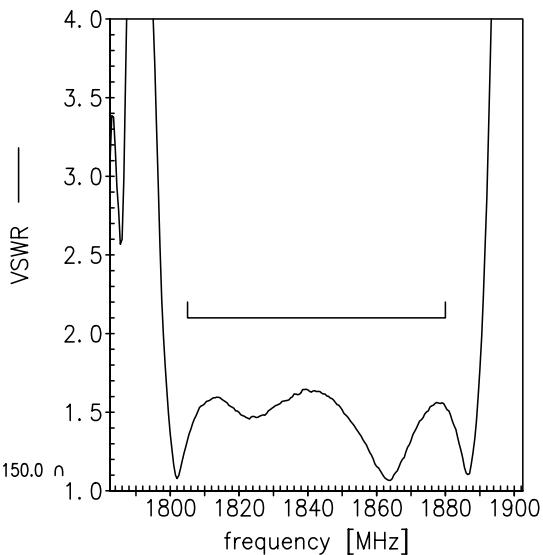
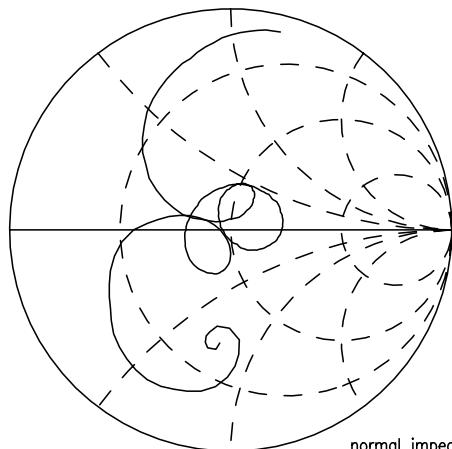
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

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**Transfer function of filter 1**

**Transfer function of filter 1 - wideband**


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

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**Smith charts filter 1**
 **$S_{11}$  function**

 **$S_{22}$  function**


**SAW Components**
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**Characteristics of filter 2 (GSM 1900)**

Temperature range for specification:  $T = -20$  to  $+75$  °C  
 Terminating source impedance:  $Z_S = 50 \Omega$  (unbalanced)  
 Terminating load impedance:  $Z_L = 150 \Omega$  (balanced)  $\parallel 13nH$

			min.	typ. @ 25 °C	max.	
<b>Center frequency</b>		$f_C$	—	1960.0	—	MHz
<b>Maximum insertion attenuation</b>		$\alpha_{max}$	—	1.3 <sup>1)</sup>	2.3 <sup>2)</sup>	dB
1930.0 ... 1990.0	MHz		—	0.4	1.4 <sup>3)</sup>	dB
<b>Amplitude ripple (p-p)</b>		$\Delta\alpha$	—	1.7	2.1	
1930.0 ... 1990.0	MHz		—	1.7	2.1	
<b>Input VSWR</b>						
1930.0 ... 1990.0	MHz		—	1.7	2.1	
<b>Output VSWR</b>						
1930.0 ... 1990.0	MHz		—	1.7	2.1	
<b>Output amplitude balance ( S<sub>31</sub>/S<sub>21</sub> )</b>						
1930.0 ... 1990.0	MHz		-1.3	-0.8/0.2	1.3	dB
<b>Output phase balance (φ(S<sub>31</sub>)-φ(S<sub>21</sub>))+180°</b>						
1930.0 ... 1990.0	MHz		-10	-7 / 5	10	°
<b>Attenuation</b>		$\alpha$				
10.0 ... 1510.0	MHz		40	44	—	dB
1510.0 ... 1830.0	MHz		30	34	—	dB
1830.0 ... 1890.0	MHz		20	25	—	dB
1890.0 ... 1910.0	MHz		12	16	—	dB
2010.0 ... 2070.0	MHz		12	17	—	dB
2070.0 ... 2400.0	MHz		19	23	—	dB
2400.0 ... 2500.0	MHz		35	40	—	dB
2500.0 ... 3860.0	MHz		28	33	—	dB
3860.0 ... 3980.0	MHz		36	43	—	dB
3980.0 ... 5790.0	MHz		30	39	—	dB
5790.0 ... 6000.0	MHz		32	40	—	dB

<sup>1)</sup> Typical value excluding PCB losses of 0.29 dB

<sup>2)</sup> 2.2 dB at 25 °C

<sup>3)</sup> 1.3 dB at 25 °C

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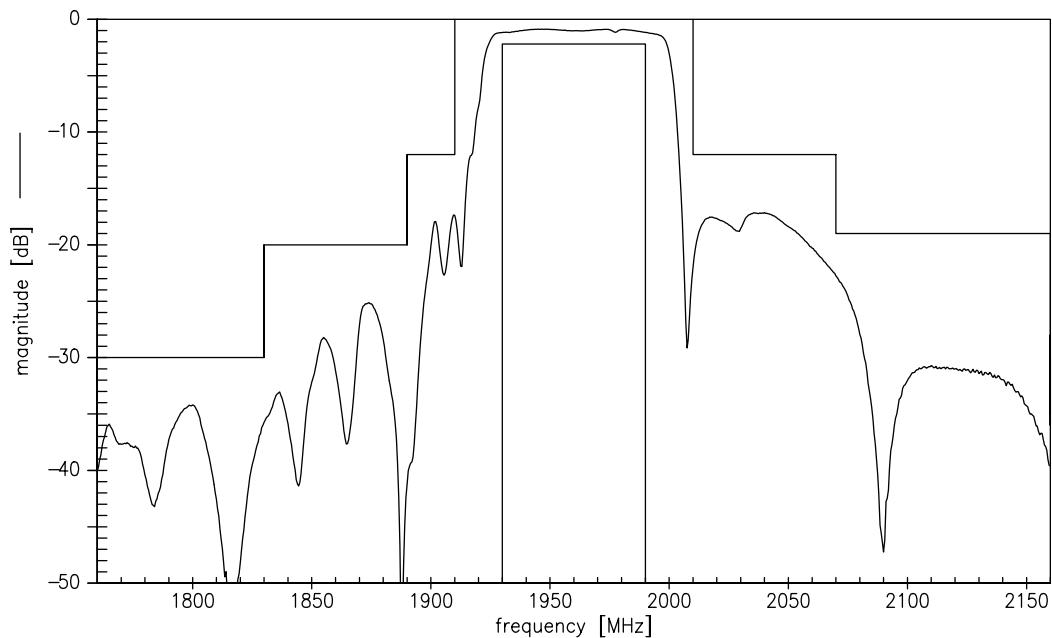
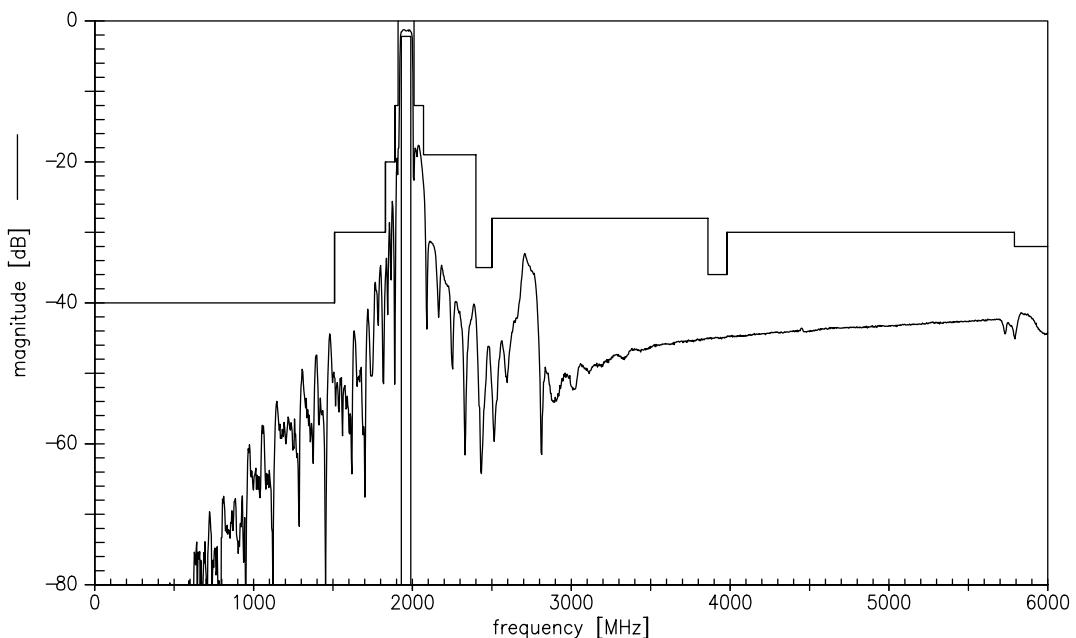
Data sheet

**Maximum ratings of filter 2**

Operable temperature range	T	–40/+85	°C	
Storage temperature range	T <sub>stg</sub>	–40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	50 <sup>1)</sup>	V	machine model, 1 pulse
Input power at GSM 850, GSM 900 GSM 1800, GSM 1900	P <sub>IN</sub>	15	dBm	effective power in the on-state, duty cycle 4:8
Tx bands	P <sub>IN</sub>	15	dBm	

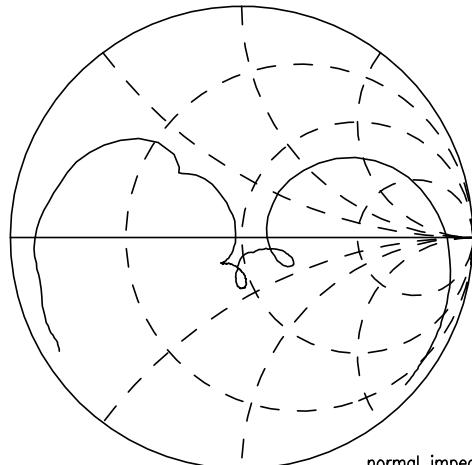
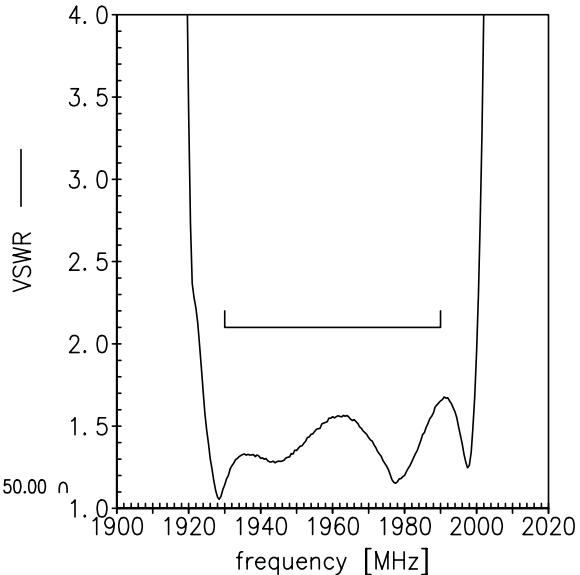
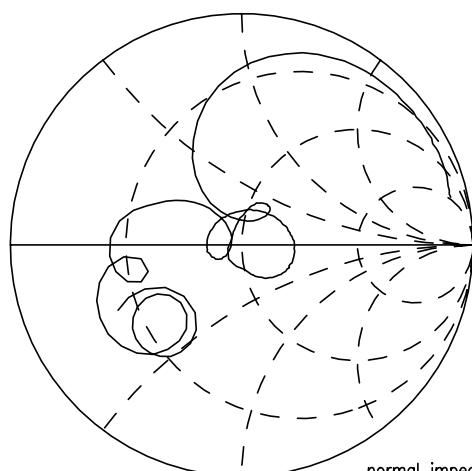
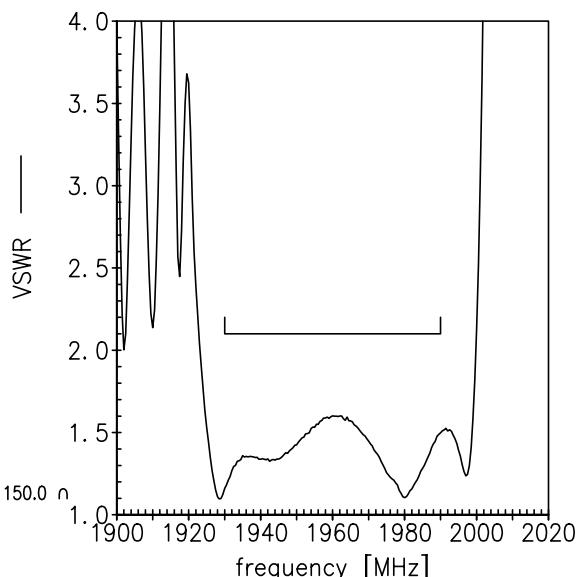
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

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**Transfer function of filter 2**

**Transfer function of filter 2 - wideband**


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**Smith charts filter 2**
 **$S_{11}$  function**

normal impedance: 50.00  $\Omega$ 

 **$S_{22}$  function**

normal impedance: 150.0  $\Omega$ 


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Data sheet

**References**

<b>Type</b>	B9507
<b>Ordering code</b>	B39202B9507L310
<b>Marking and package</b>	C61157-A7-A153
<b>Packaging</b>	F61074-V8226-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9507_UB_NB.s3p B9507_UB_WB.s3p B9507_LB_NB.s3p B9507_LB_WB.s3p
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	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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