



SAW Components

SAW Rx 2in1 filter

GSM 1800 / GSM 1900

Series/type:	B9804
Ordering code:	B39202B9804P810
Date:	June 15, 2010
Version:	2.0

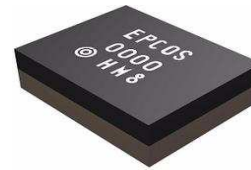


Data sheet



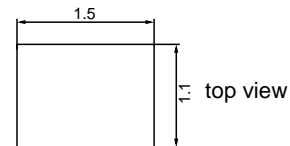
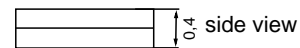
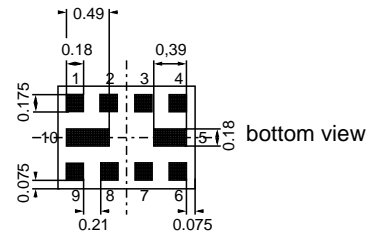
Application

- 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 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12



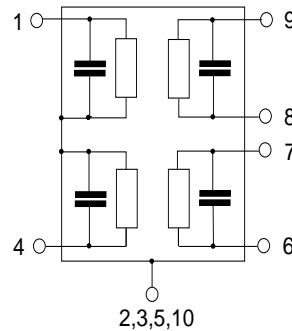
Features

- Package size 1.5 x 1.1 x 0.4 mm³
- RoHS compatible
- Approx. weight 0.003g.
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitive Level 3



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





Data sheet



Characteristics of Filter 1 (GSM 1800)

Temperature range for specification: $T = -20\text{ °C to }+75\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 150\ \Omega \parallel 15\text{ nH (balanced)}$

		min.	typ. @25°C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}	—	1.4 ¹⁾	2.4 ²⁾	dB
1805.0 ... 1880.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.7	1.4 ³⁾	dB
1805.0 ... 1880.0 MHz					
Input VSWR		—	1.7	2.0	
1805.0 ... 1880.0 MHz					
Output VSWR		—	1.7	2.0	
1805.0 ... 1880.0 MHz					
Output amplitude balance (S_{31}/S_{21})		-1.2	-0.8/0.9	1.2	dB
1805.0 ... 1880.0 MHz					
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)		-10	-2/+9	10	°
1805.0 ... 1880.0 MHz					
Attenuation	α				
10.0 ... 940.0 MHz		45	50	—	dB
940.0 ... 1705.0 MHz		28	40	—	dB
1705.0 ... 1785.0 MHz		12 ⁴⁾	16	—	dB
1920.0 ... 1980.0 MHz		17 ⁵⁾	23	—	dB
1980.0 ... 2030.0 MHz		25	30	—	dB
2030.0 ... 2400.0 MHz		28	33	—	dB
2400.0 ... 2500.0 MHz		32	37	—	dB
2500.0 ... 2775.0 MHz		28	31	—	dB
2775.0 ... 2880.0 MHz		38	46	—	dB
2880.0 ... 3610.0 MHz		28	44	—	dB
3610.0 ... 3760.0 MHz		38	43	—	dB
3760.0 ... 5415.0 MHz		28	36	—	dB
5415.0 ... 5640.0 MHz		32	36	—	dB
5640.0 ... 6000.0 MHz		28	35	—	dB

1) Typical value excluding PCB losses of 0.24 dB.

2) 2.0 dB at 25 °c

3) 1.4 dB at 25 °c

4) 14.0 dB at 25 °c

5) 20.0 dB at 25 °c



SAW Components	B9804
SAW Rx 2in1 filter	1842.5 / 1960.0 MHz
Data sheet	SMD

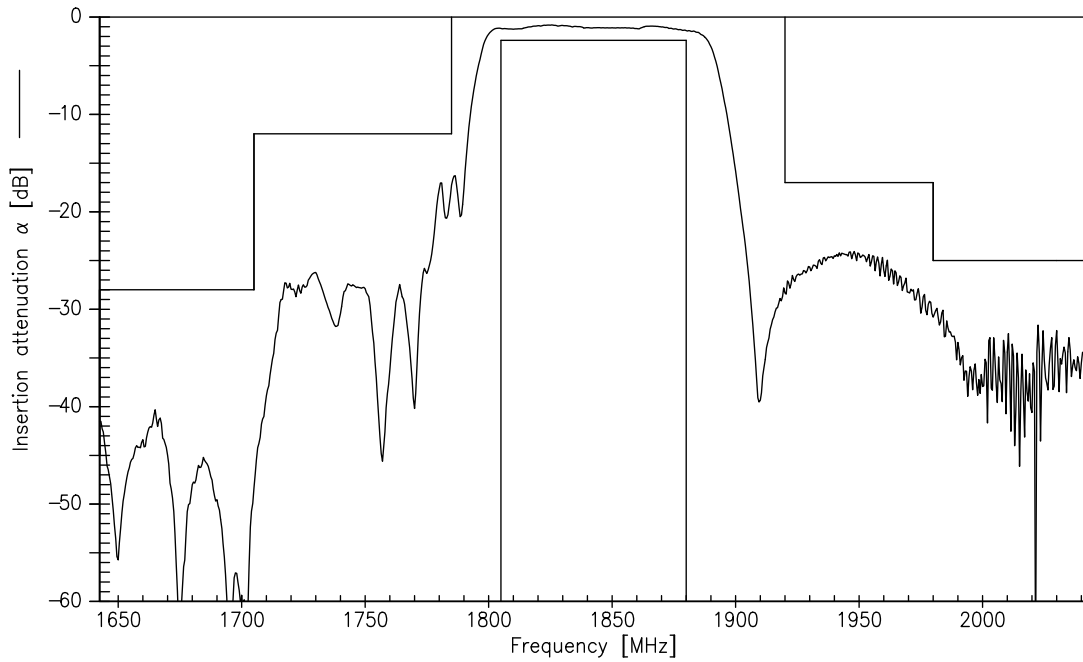
Maximum ratings of Filter 1

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				
GSM 850, GSM 900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P _{IN}	15	dBm	
Tx bands				

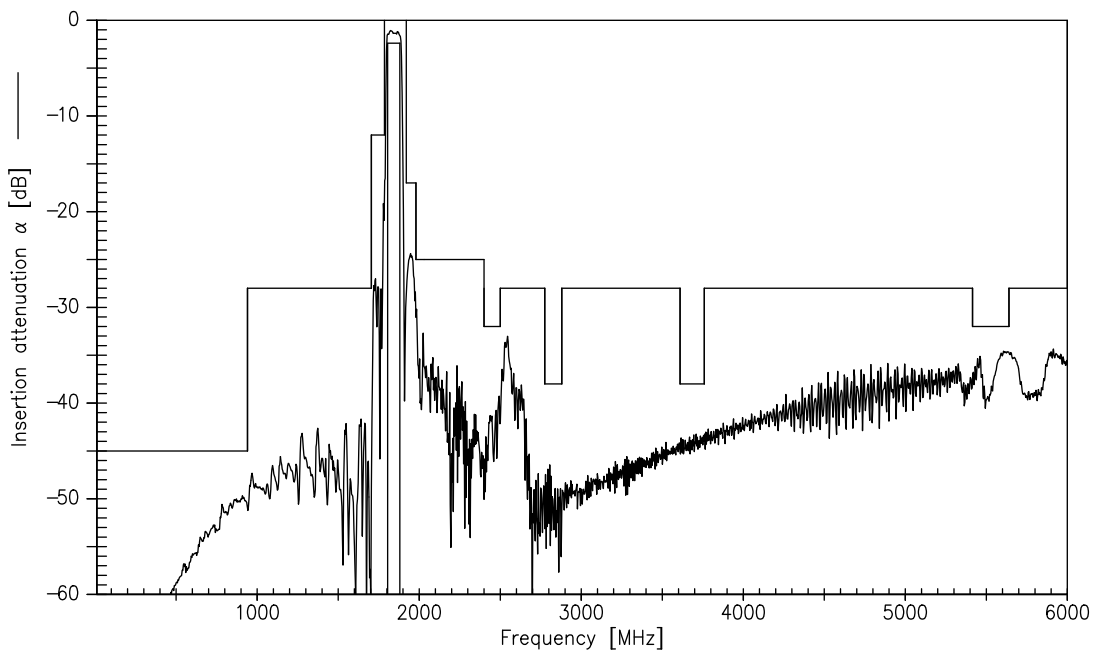
¹⁾ acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function of Filter 1 - narrowband



Transfer function of Filter 1 - wideband

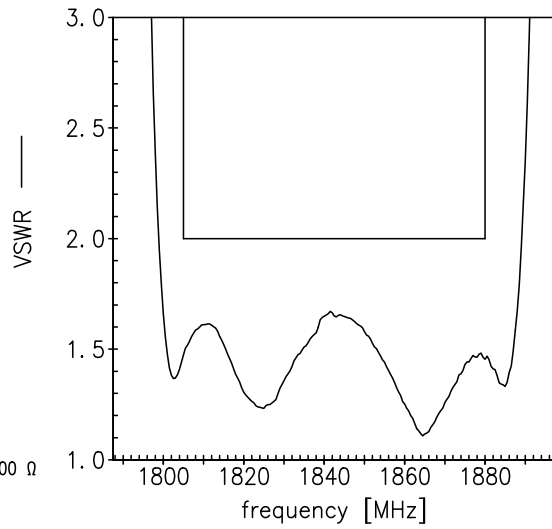
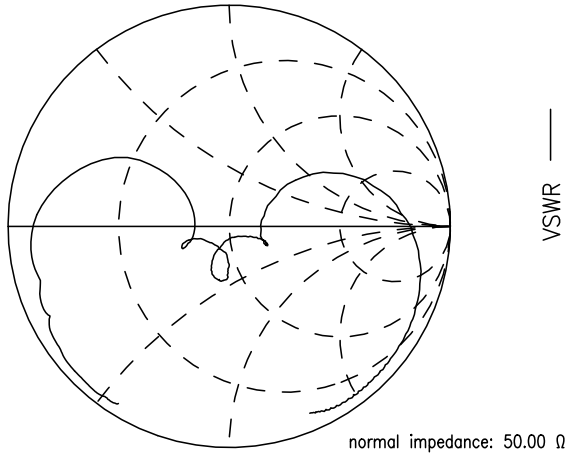


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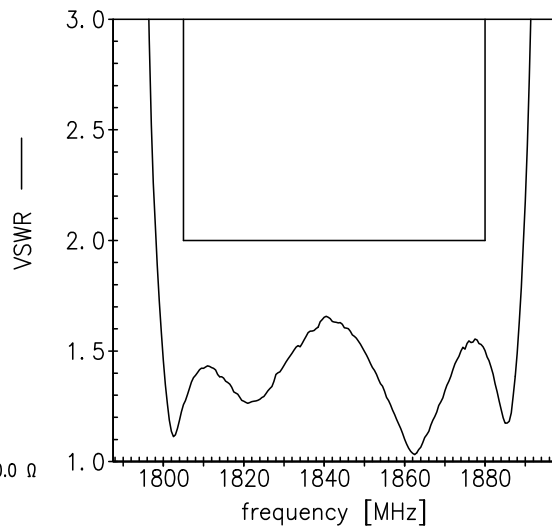
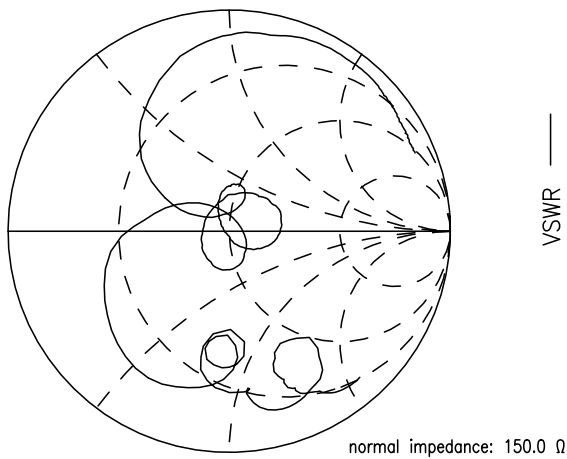
SMD

Smith Charts Filter 1

S₁₁ function



S₂₂ function





Characteristics of Filter 2 (GSM 1900)

Temperature range for specification: $T = -20\text{ °C to }+75\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 150\ \Omega \parallel 15\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	α_{max}	—	1.4 ¹⁾	2.5 ²⁾	dB
1930.0 ... 1990.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.5	1.6 ³⁾	dB
1930.0 ... 1990.0 MHz					
Input VSWR		—	1.7	2.0	
1930.0 ... 1990.0 MHz					
Output VSWR		—	1.7	2.0	
1930.0 ... 1990.0 MHz					
Output amplitude balance (S_{31}/S_{21})		-1.2	-0.3/0.8	1.2	dB
1930.0 ... 1990.0 MHz					
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)		-10	-6/+8	10	°
1930.0 ... 1990.0 MHz					
Attenuation	α				
10.0 ... 1510.0 MHz		40	47	—	dB
1510.0 ... 1830.0 MHz		30	32	—	
1830.0 ... 1850.0 MHz		26	30	—	dB
1850.0 ... 1890.0 MHz		23	25	—	
1890.0 ... 1910.0 MHz		12 ⁴⁾	17	—	dB
2010.0 ... 2070.0 MHz		12 ⁵⁾	17	—	
2070.0 ... 2400.0 MHz		20	22	—	dB
2400.0 ... 2500.0 MHz		35	41	—	
2500.0 ... 3860.0 MHz		28	32	—	dB
3860.0 ... 3980.0 MHz		36	43	—	
3980.0 ... 5790.0 MHz		30	37	—	dB
5790.0 ... 6000.0 MHz		32	37	—	

1) Typical value excluding PCB losses of 0.24 dB.
 2) 2.0 dB at 25 °c
 3) 1.3 dB at 25 °c
 4) 14 dB at 25 °c
 5) 14 dB at 25 °c



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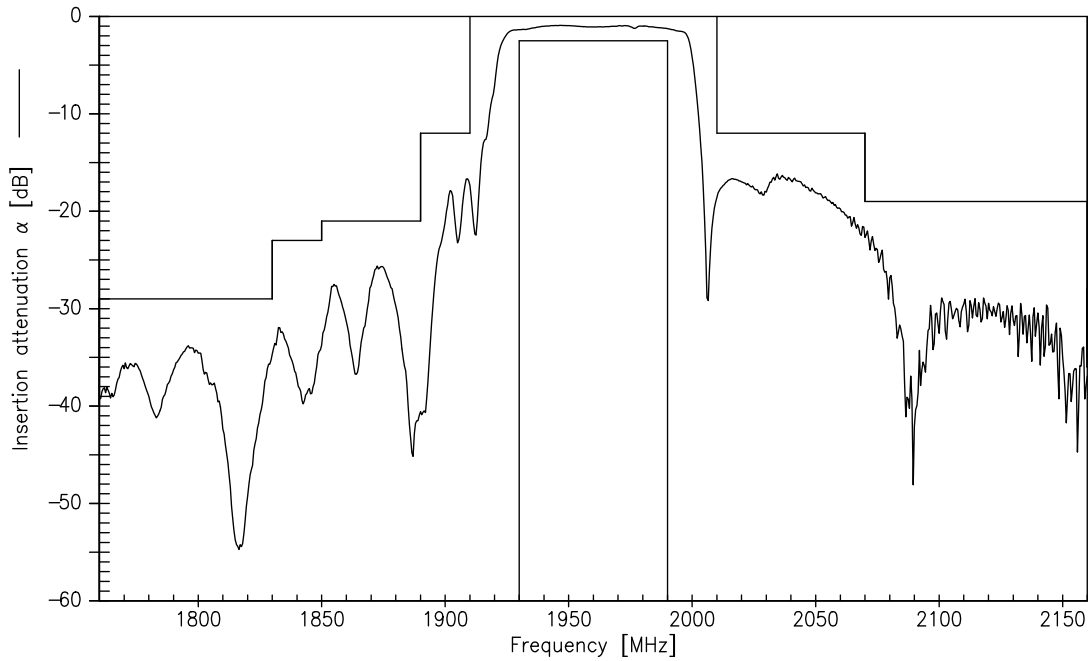
Maximum ratings of Filter 2

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				
GSM 850, GSM 900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P _{IN}	15	dBm	
Tx bands				

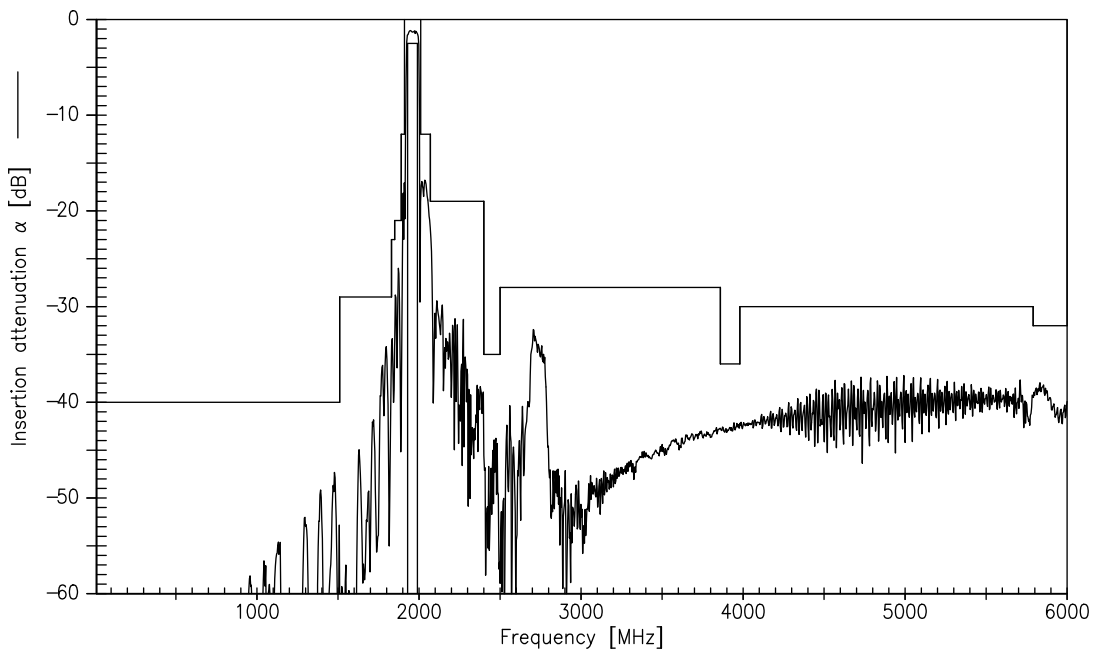
¹⁾ acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function of Filter 2 - narrowband



Transfer function of Filter 2 - wideband

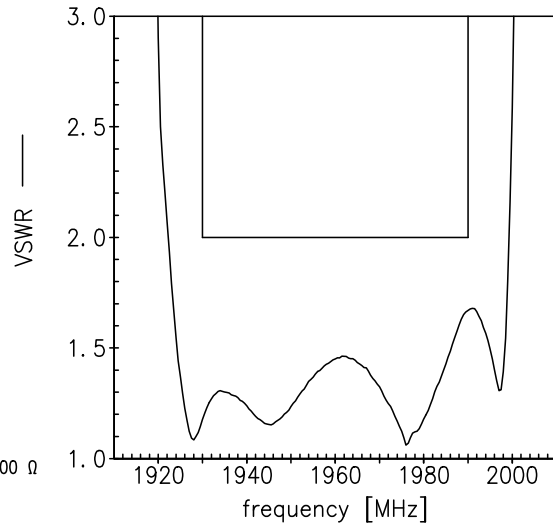
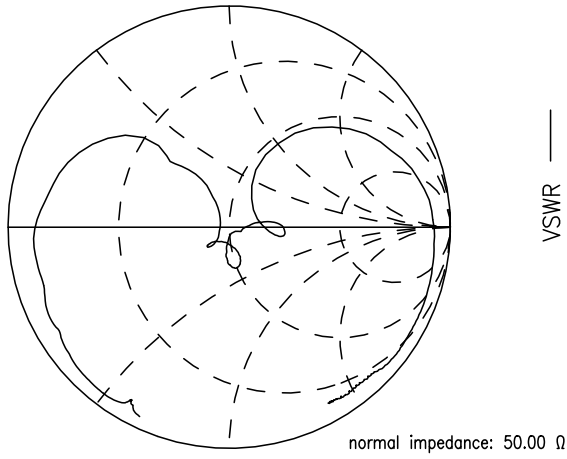


Data sheet

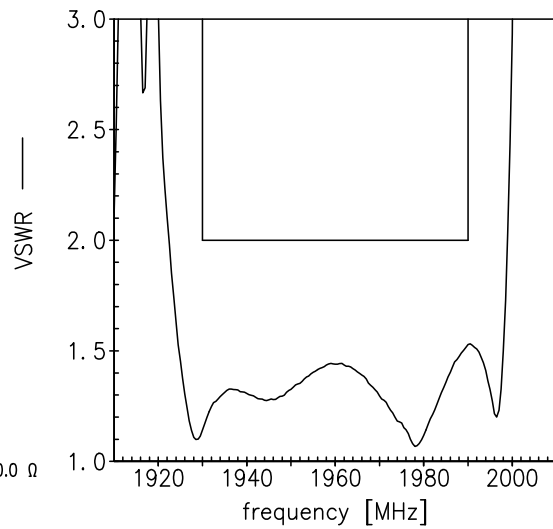
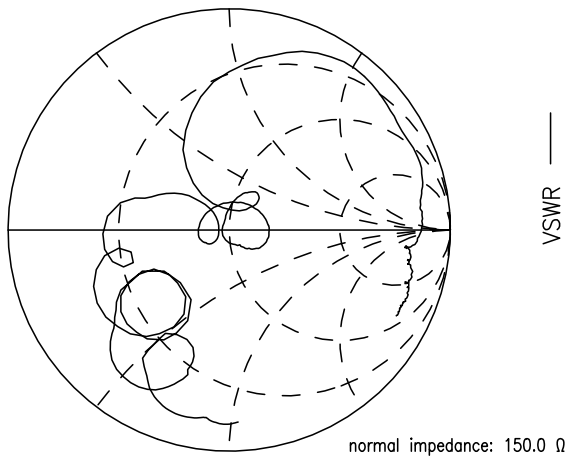
SMD

Smith Charts Filter 2

S₁₁ function



S₂₂ function





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References

Type	B9804
Ordering code	B39202B9804P810
Marking and package	C61157-A8-A19
Packaging	F61074-V8227-Z000
Date codes	L_1126
S-parameters	B9804_LB_NB.s3p B9804_LB_WB.s3p B9804_UB_NB.s3p B9804_UB_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.

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