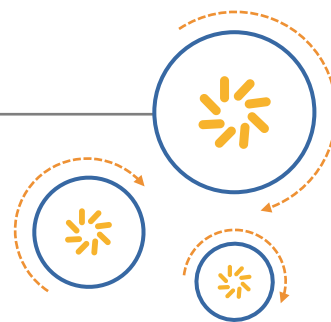


RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



SAW Components

SAW Rx 2in1 diplex filter

GSM 1800 / GSM 1900

Series/type: B9823
Ordering code: B39202B9823P810

Date: June 7, 2016
Version: 2.1

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SAW Components

SAW Rx 2in1 duplex filter

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SAW Components

B9823

SAW Rx 2in1 duplex filter

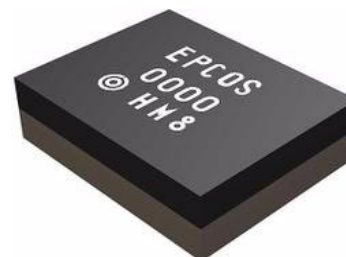
881.50 / 1960.00 MHz

Design goal



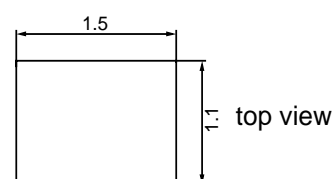
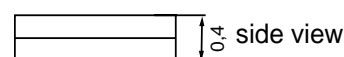
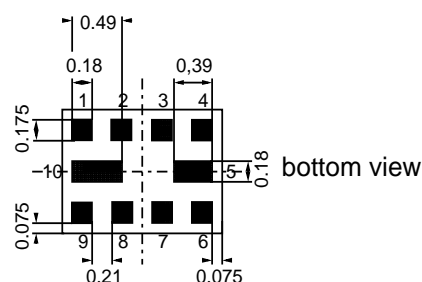
Application

- 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



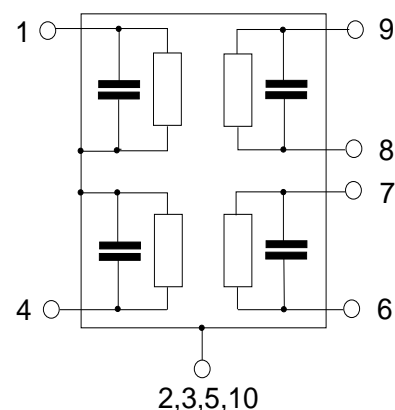
Features

- Package size 1.5 x 1.1 x 0.4 mm³
- RoHS compatible
- Approximate 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]
- 8,9 Output, balanced [Duplex]
- 6,7 To be grounded
- 2,3,5,10 Case-ground



SAW Components
B9823
SAW Rx 2in1 duplex filter
881.50 / 1960.00 MHz
Design goal

Characteristics of Filter 1 (GSM1800)

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

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{\max}	—	1.8	2.7	dB
1805.0 ... 1880.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.6	1.4	dB
1805.0 ... 1880.0 MHz					
Input VSWR		—	1.9	2.3	
1805.0 ... 1880.0 MHz					
Output VSWR		—	1.8	2.2	
1805.0 ... 1880.0 MHz					
CMRR ($S_{21}-S_{31} / S_{21}+S_{31}$)		20	24	—	dB
1805.0 ... 1880.0 MHz					
Attenuation	α				
0.2 ... 902.0 MHz		45	56	—	dB
902.0 ... 940.0 MHz		45	54	—	dB
940.0 ... 1690.0 MHz		27	35	—	dB
1690.0 ... 1705.0 MHz		27	37	—	dB
1705.0 ... 1785.0 MHz		10	15	—	dB
1920.0 ... 1980.2 MHz		20	23	—	dB
1980.2 ... 2030.0 MHz		24	28	—	dB
2030.0 ... 2400.0 MHz		28	29	—	dB
2400.0 ... 6000.0 MHz		34	36	—	dB

SAW Components
B9823
SAW Rx 2in1 duplex filter
881.50 / 1960.00 MHz
Design goal

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

SAW Components

B9823

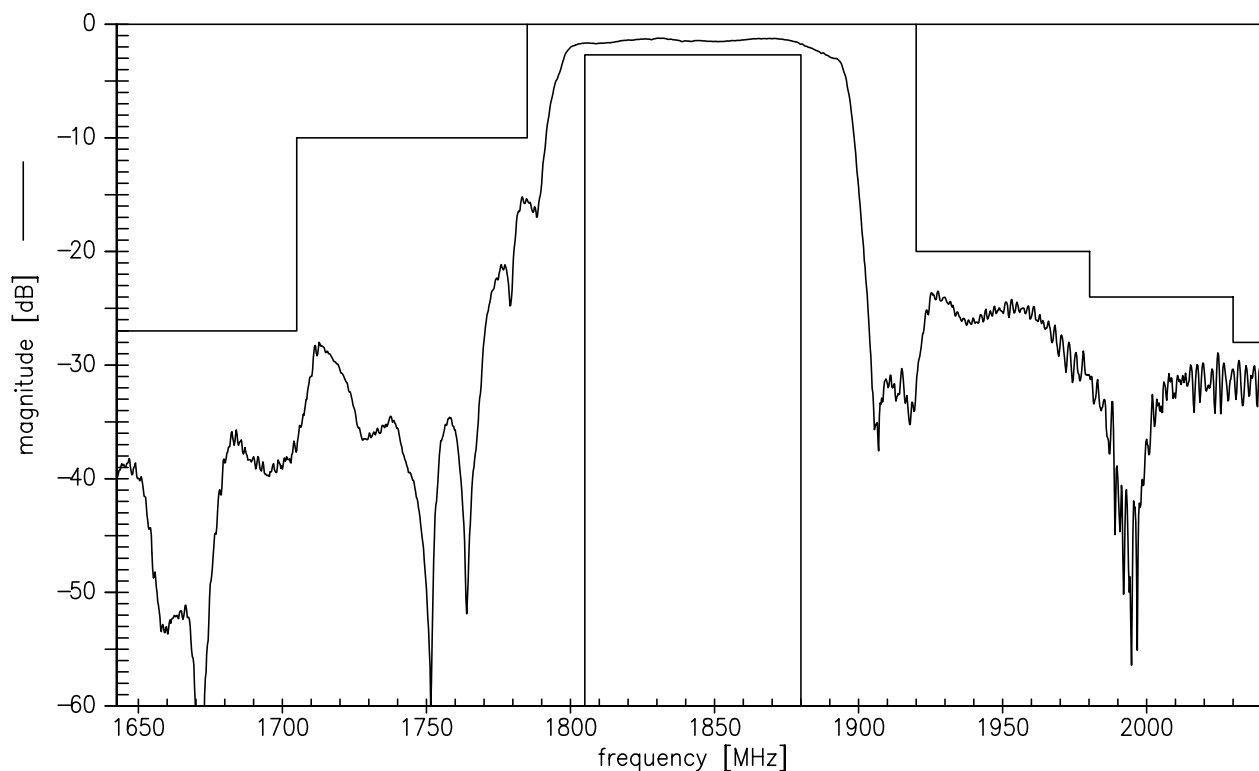
SAW Rx 2in1 duplex filter

881.50 / 1960.00 MHz

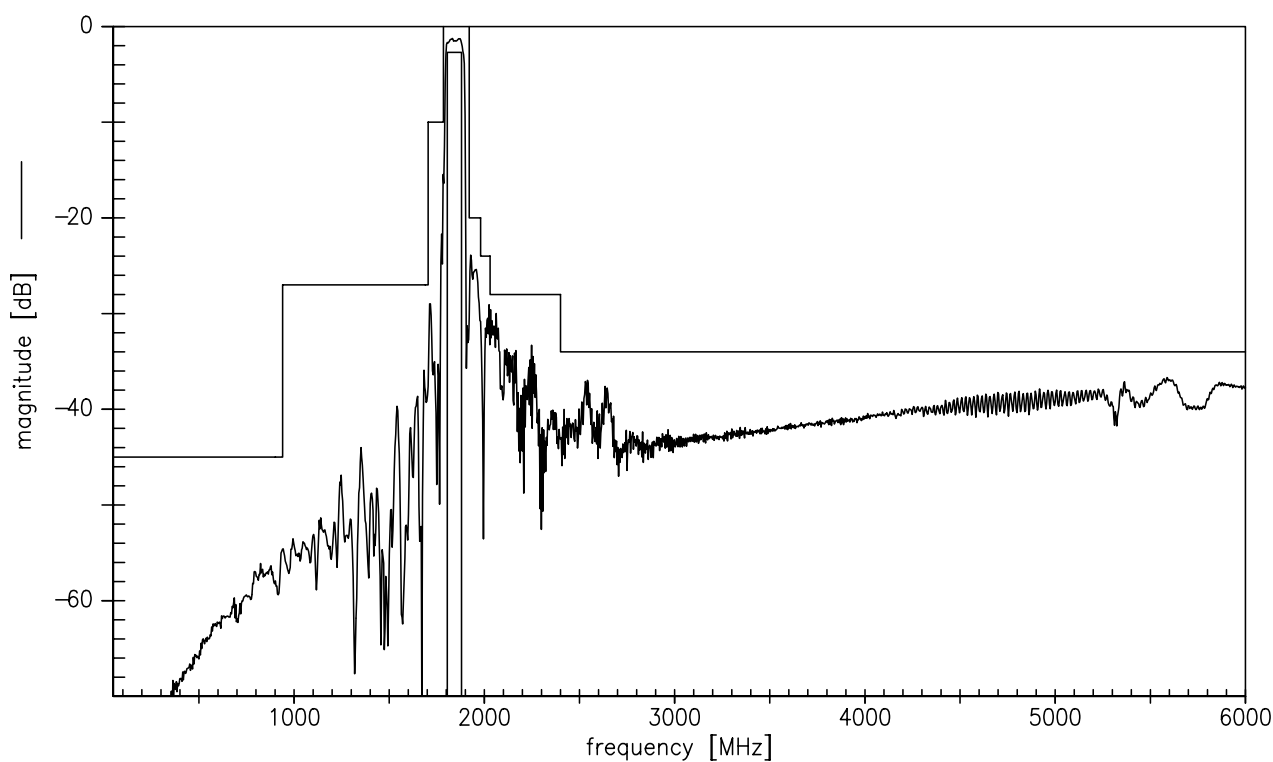
Design goal



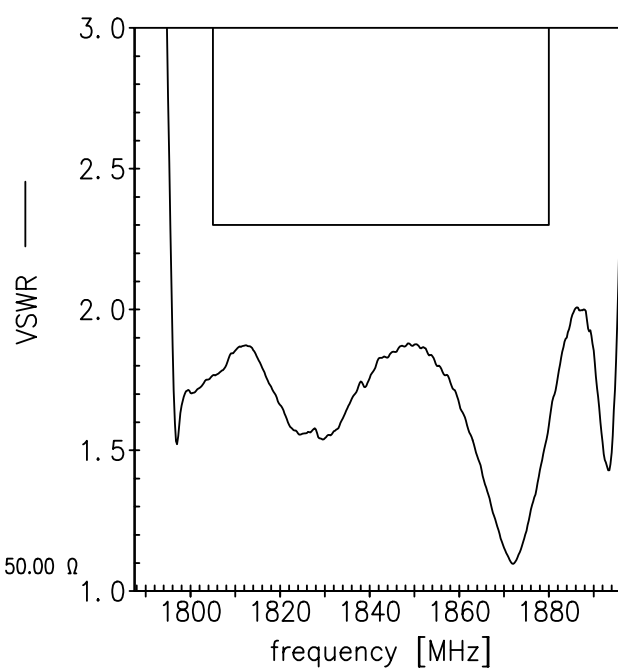
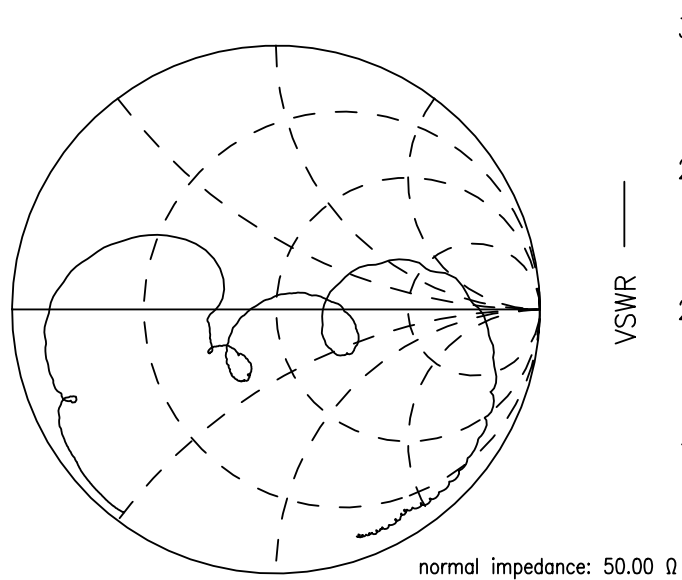
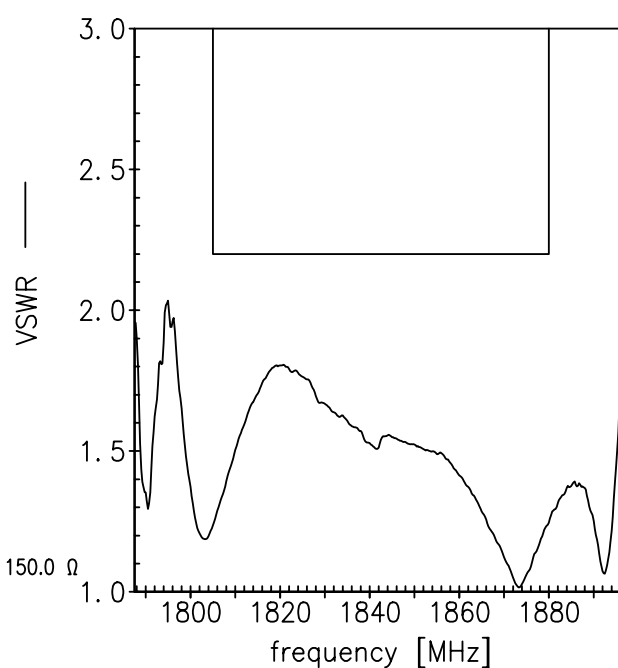
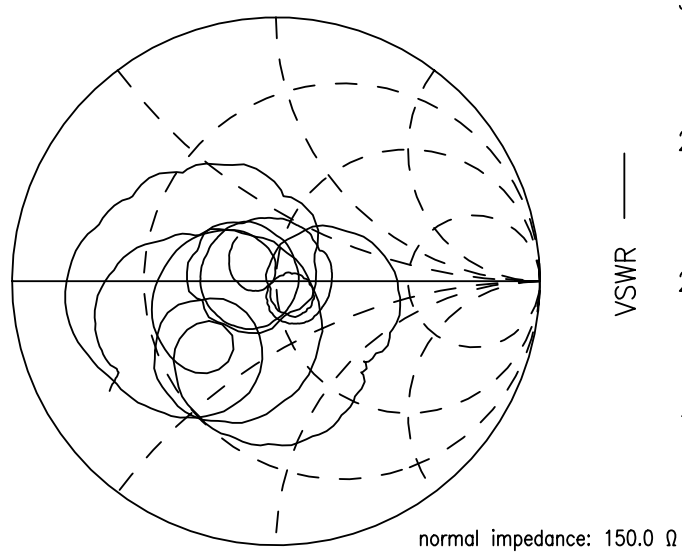
Transfer function Filter 1 (GSM1800)



Transfer function Filter 1 (GSM1800) - Wideband



Design goal

Smith charts Filter 1 (GSM1800)
 S_{11} function

 S_{22} function


SAW Components
B9823
SAW Rx 2in1 duplex filter
881.50 / 1960.00 MHz
Design goal

Characteristics of Filter 2 (GSM1900)

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

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	α_{\max}	—	2.0	2.8	dB
1930.0 ... 1990.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.6	1.5	dB
1930.0 ... 1990.0 MHz					
Input VSWR		—	1.8	2.3	
1930.0 ... 1990.0 MHz					
Output VSWR		—	1.7	2.1	
1930.0 ... 1990.0 MHz					
CMRR ($ S_{21}-S_{31} / S_{21}+S_{31} $)		16	22	—	dB
1930.0 ... 1990.0 MHz					
Attenuation	α				
0.2 ... 1510.0 MHz		45	53	—	dB
1510.0 ... 1830.0 MHz		30	40	—	dB
1830.0 ... 1850.0 MHz		26	33	—	dB
1850.0 ... 1890.0 MHz		23	34	—	dB
1890.0 ... 1910.0 MHz		7 ¹⁾	14	—	dB
2010.2 ... 2070.0 MHz		7 ²⁾	19	—	dB
2070.0 ... 2400.0 MHz		22	33	—	dB
2400.0 ... 6000.0 MHz		35	42	—	dB

1) 10dB @ $-20\text{ }^{\circ}\text{C to }+75\text{ }^{\circ}\text{C}$

2) 10dB @ $-5\text{ }^{\circ}\text{C to }+85\text{ }^{\circ}\text{C}$

SAW Components
B9823
SAW Rx 2in1 duplex filter
881.50 / 1960.00 MHz
Design goal

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.

SAW Components

B9823

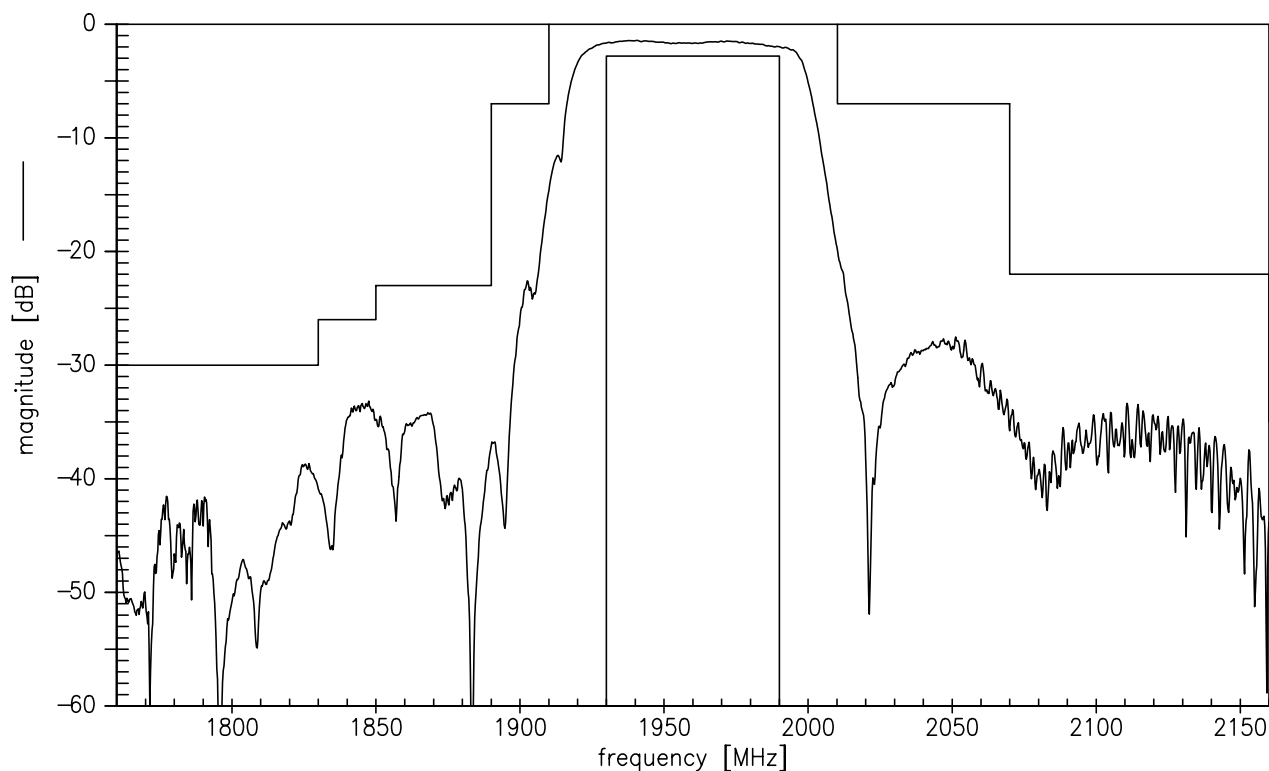
SAW Rx 2in1 duplex filter

881.50 / 1960.00 MHz

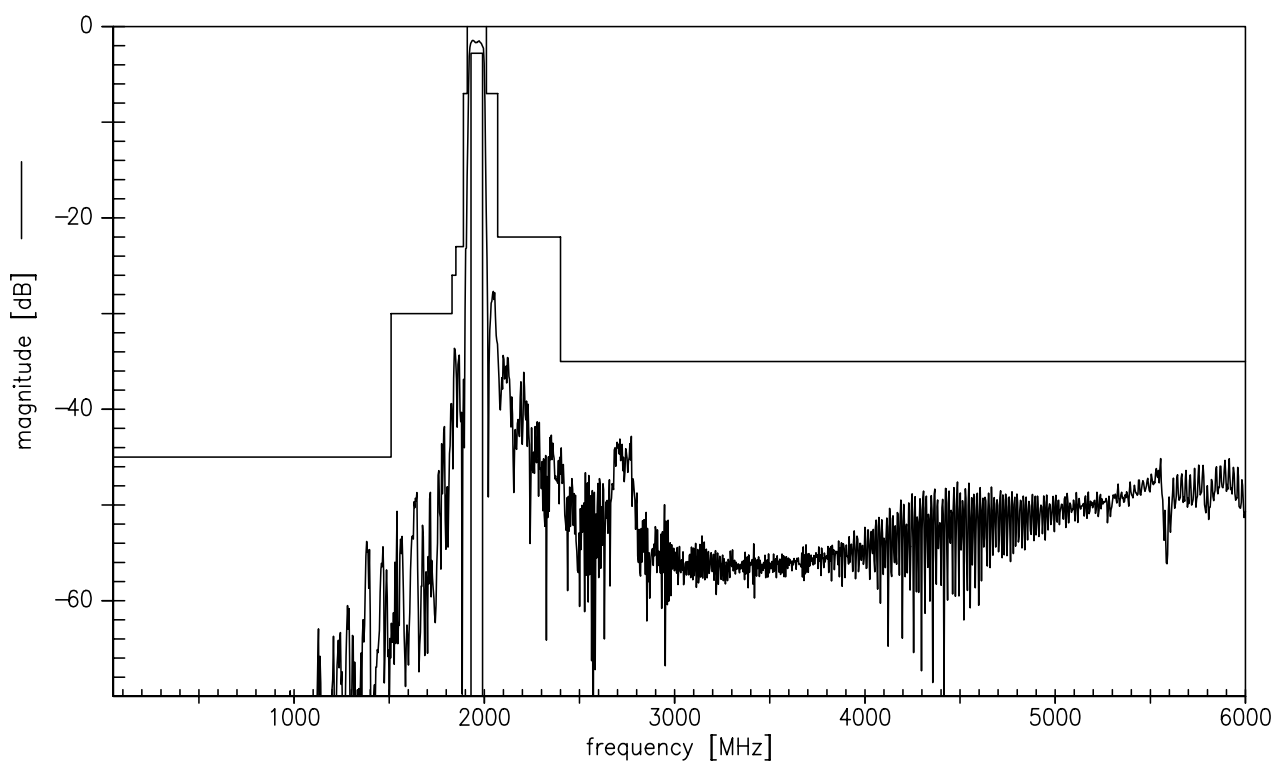
Design goal



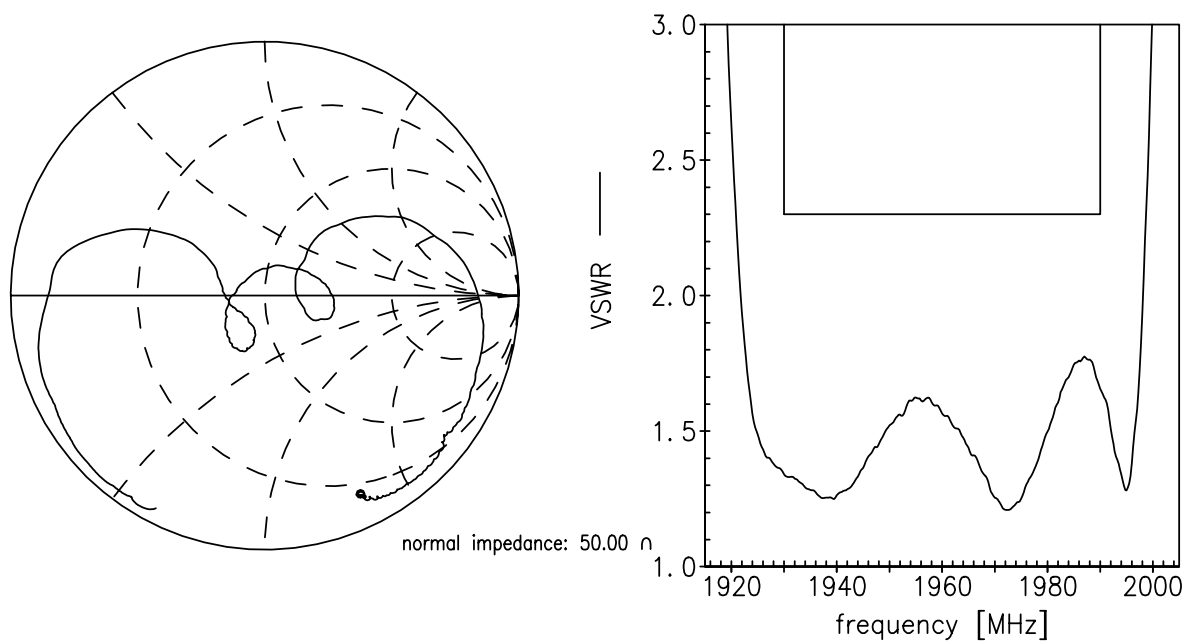
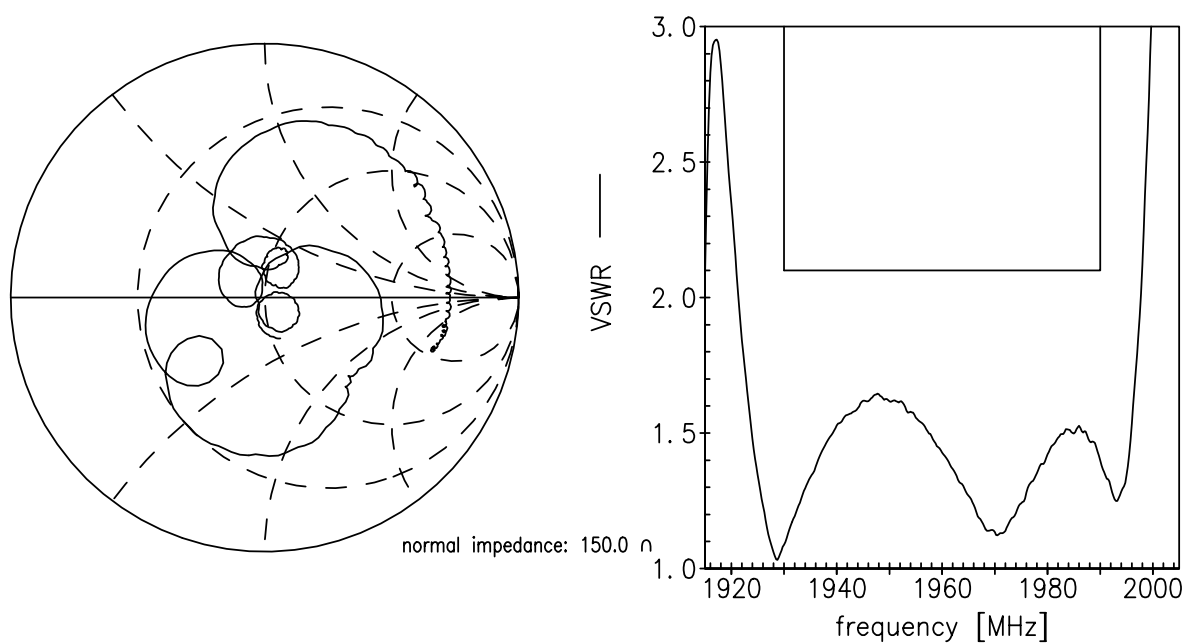
Transfer function Filter 2 (GSM1900)



Transfer function Filter 2 (GSM1900) - Wideband



Design goal

Smith charts Filter 2 (GSM1900)
 S_{11} function

 S_{22} function


SAW Components
B9823
SAW Rx 2in1 duplex filter
881.50 / 1960.00 MHz
Design goal

References

Type	B9823
Ordering code	B39202B9823P810
Marking and package	C61157-A8-A19
Packaging	F61074-V8227-Z000
Date codes	L_1126
S-parameters	B9823_LB_NB.s3p, B9823_LB_WB.s3p B9823_UB_NB.s3p, B9823_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.
Matching coils	See http://www.tdk.co.jp/tefe02/coil.htm#aname1 http://www.tdk.co.jp/etvcl/index.htm for a large variety of matching coils.

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