SAW Components

SAW Rx 2in1 diplex filter

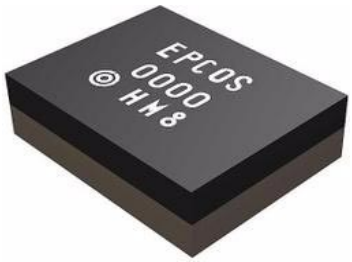
GSM 1800 / GSM 1900

Series/type:	**B9823**
Ordering code:	**B39202B9823P810**
Date:	June 7, 2016
Version:	2.1

Design goal

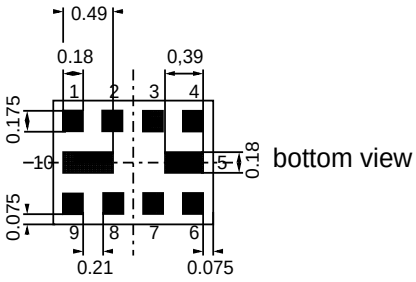
Application

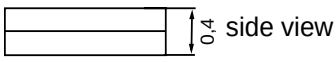
- Low-loss 2in1 RF filter for mobile telephone GSM 1800 and GSM 1900 systems, receive path (Rx)
- Usable passband:
  Filter 1 (GSM 1800): 75 MHz
  Filter 2 (GSM 1900): 60 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Suitable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

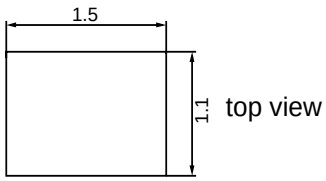


Features

- Package size 1.5 x1.1 x 0.4 mm³
- RoHS compatible
- Approximate weight 0.003g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3

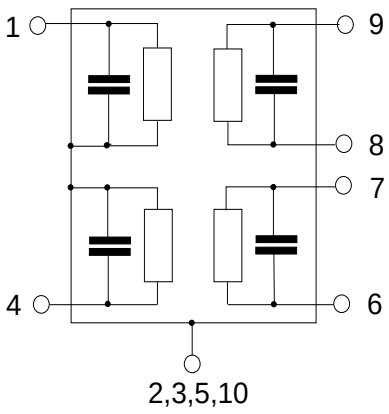






Pin configuration

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



Design goal

SMD

Characteristics of Filter 1 (GSM1800)

Temperature range for specification: T = –20 ˚C to +85˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 150 Ω || 6.8 nH (balanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}				
1805.0 ... 1880.0 MHz		—	1.8	2.7	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1805.0 ... 1880.0 MHz		—	0.6	1.4	dB
Input VSWR					
1805.0 ... 1880.0 MHz		—	1.9	2.3	
Output VSWR					
1805.0 ... 1880.0 MHz		—	1.8	2.2	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1805.0 ... 1880.0 MHz		20	24	—	dB
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

Design goal

SMD

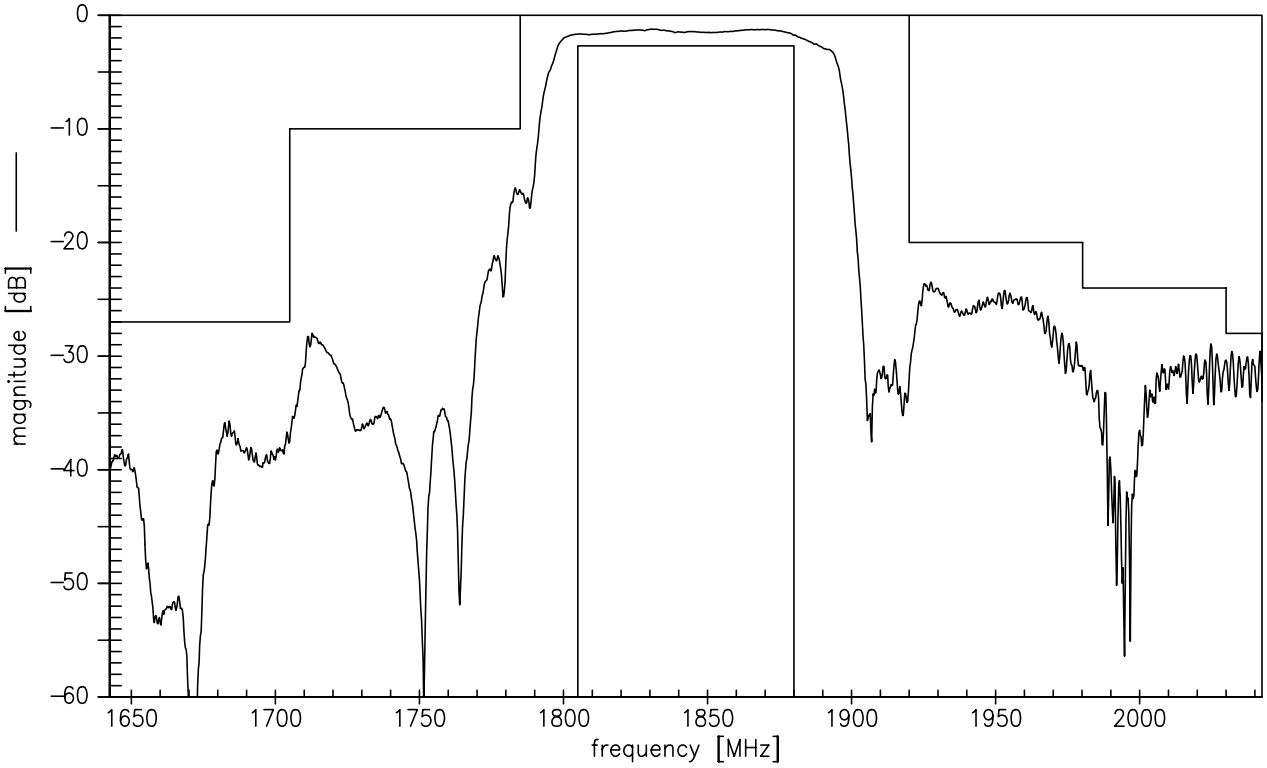
Maximum ratings of Filter 1

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				
GSM850, GSM900	P_{IN}	15	dBm	effective power in the on-state,
GSM1800, GSM1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

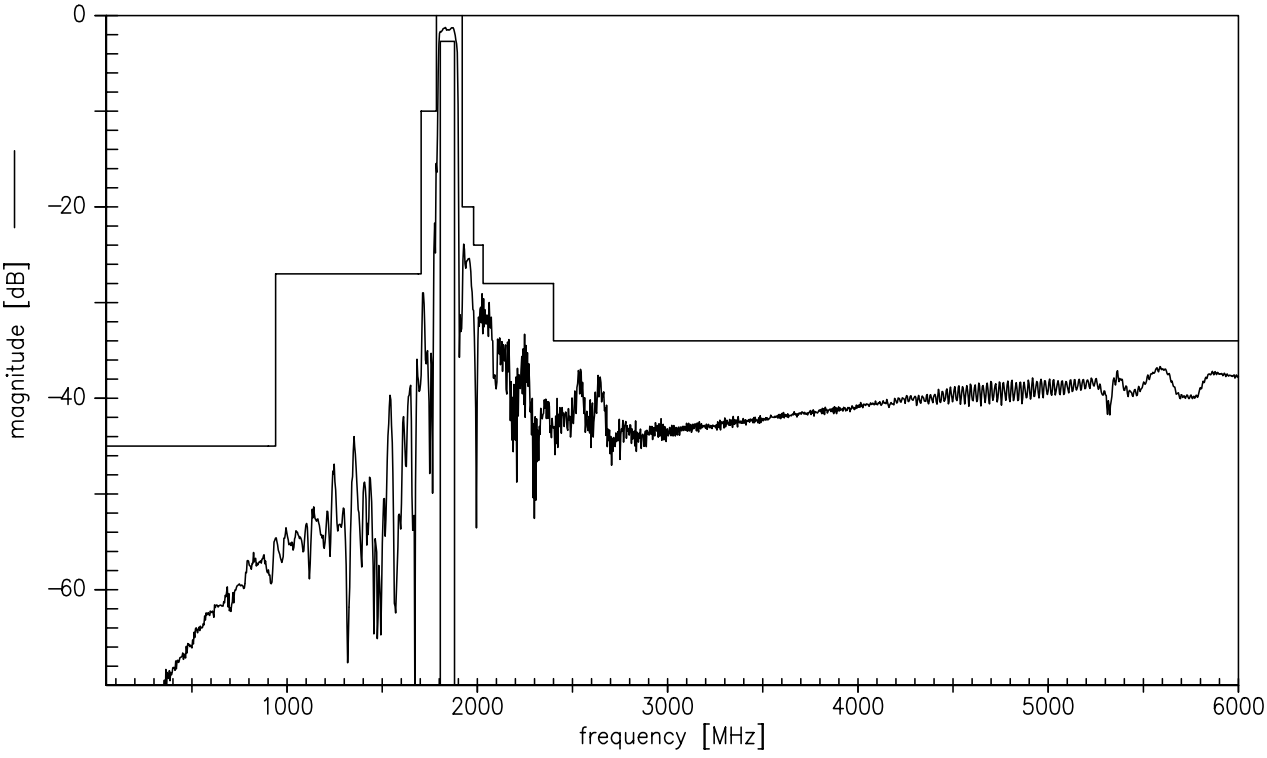
1) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

Design goal SMD

Transfer function Filter 1 (GSM1800)



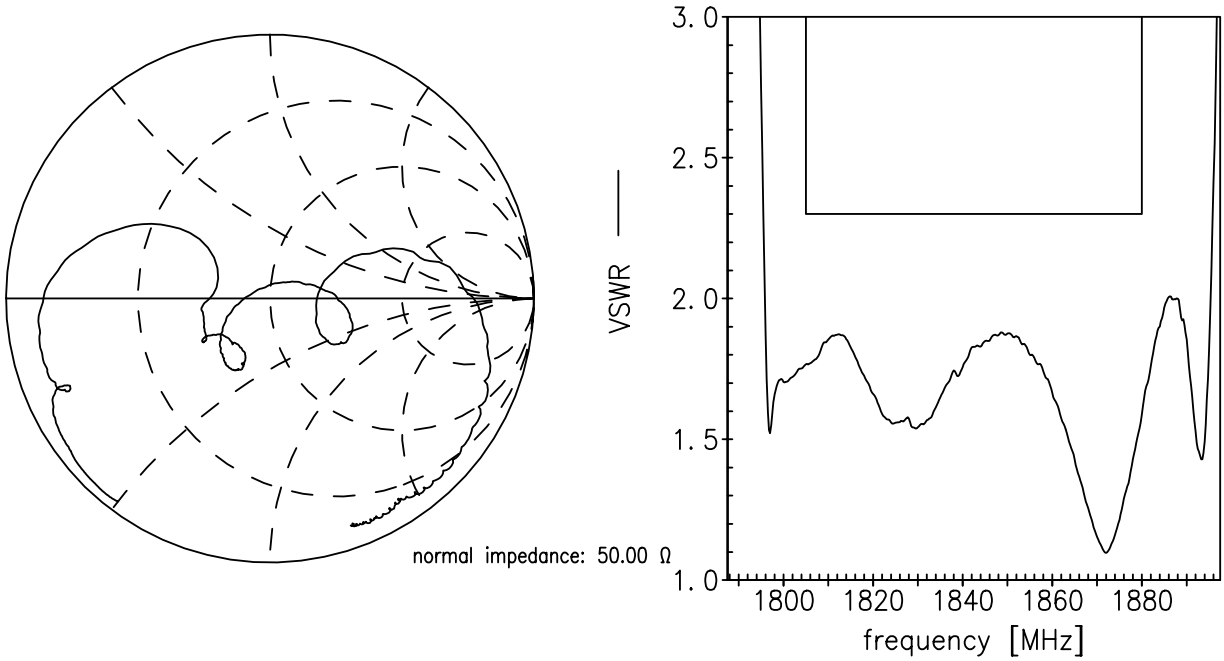
Transfer function Filter 1 (GSM1800) - Wideband



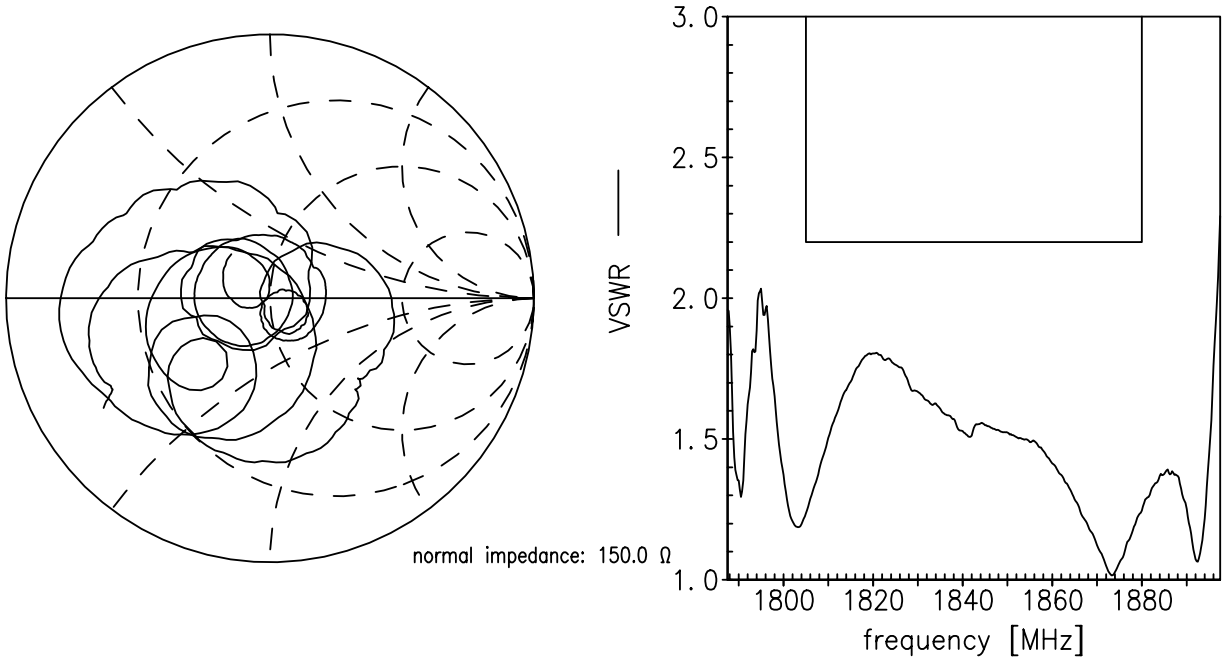
Design goal SMD

Smith charts Filter 1 (GSM1800)

S_{11} function



S_{22} function



Design goal

SMD

Characteristics of Filter 2 (GSM1900)

Temperature range for specification: T = –20 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 150 Ω || 6.8 nH (balanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	α_{max}				
1930.0 ... 1990.0 MHz		—	2.0	2.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1930.0 ... 1990.0 MHz		—	0.6	1.5	dB
Input VSWR					
1930.0 ... 1990.0 MHz		—	1.8	2.3	
Output VSWR					
1930.0 ... 1990.0 MHz		—	1.7	2.1	
CMRR ($\|S_{21}-S_{31}\|/\|S_{21}+S_{31}$)					
1930.0 ... 1990.0 MHz		16	22	—	dB
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 ˚C to +75 ˚C
2) 10dB @ –5 ˚C to +85 ˚C

Design goal

SMD

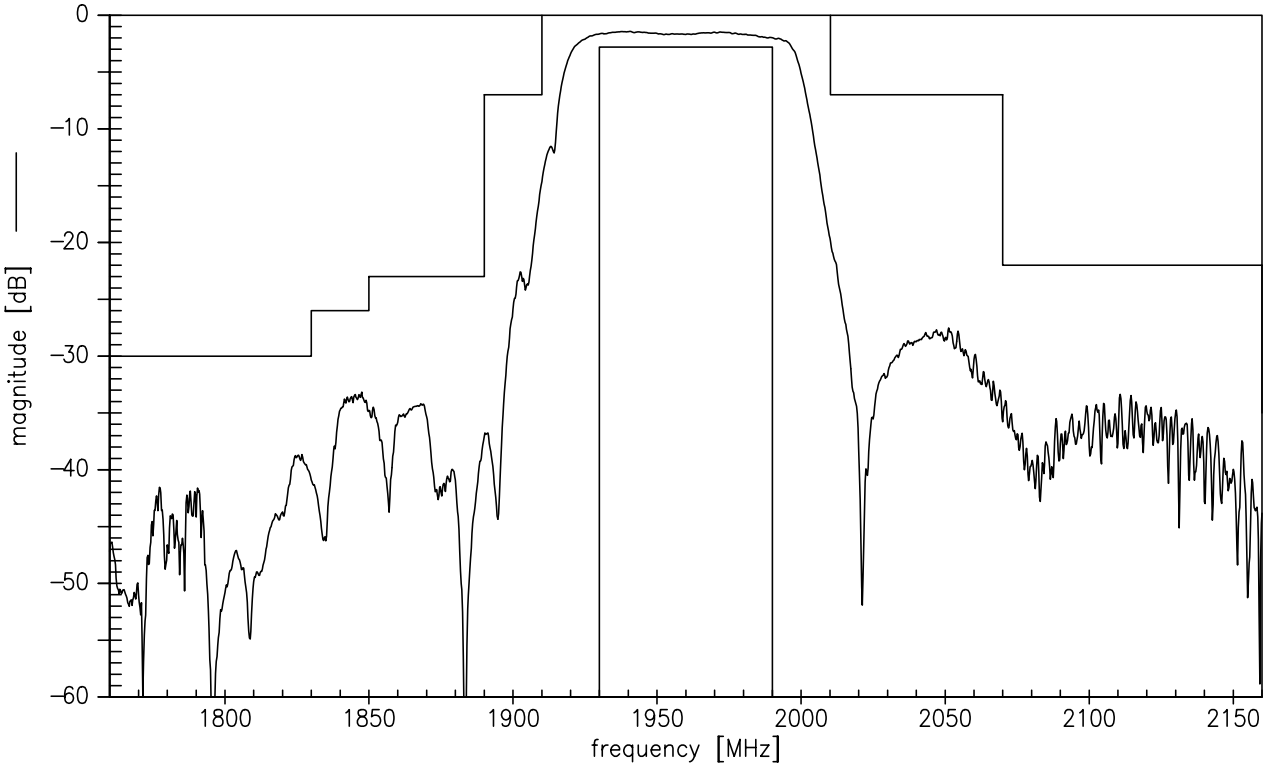
Maximum ratings of Filter 2

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				

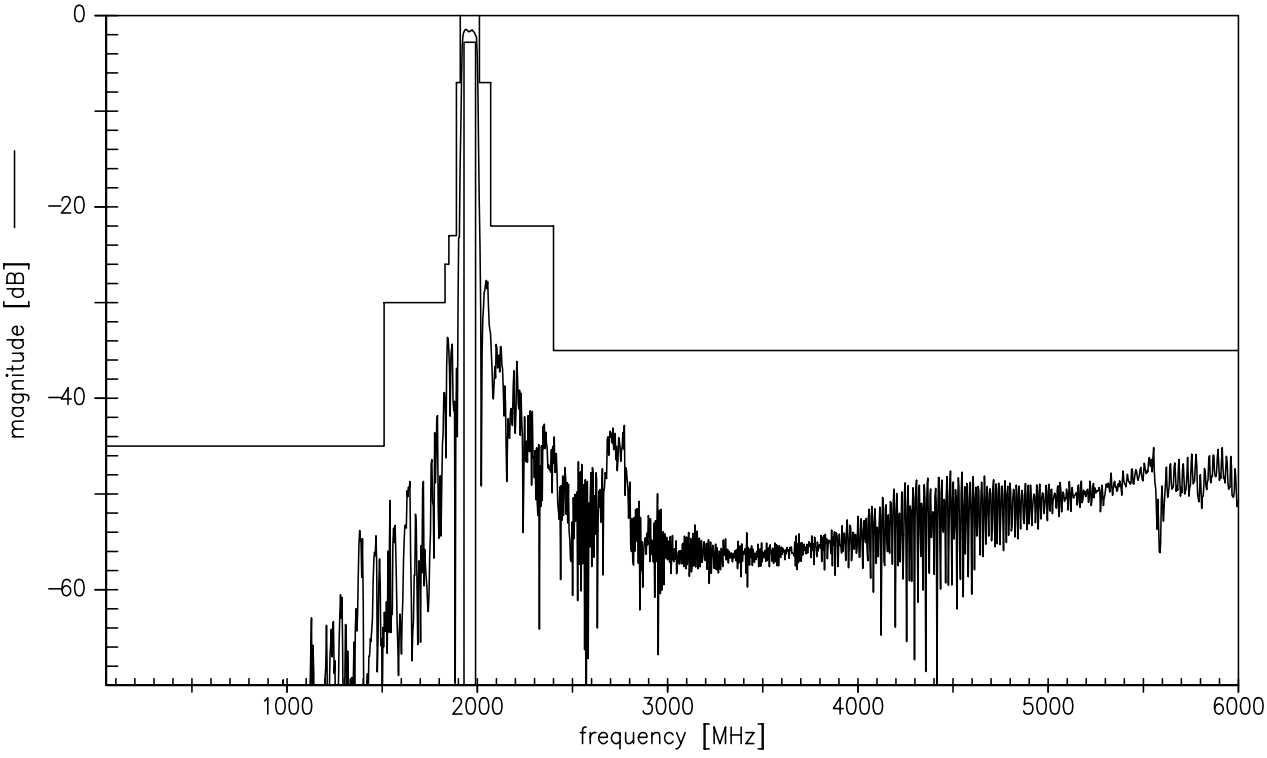
1) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

Design goal SMD

Transfer function Filter 2 (GSM1900)



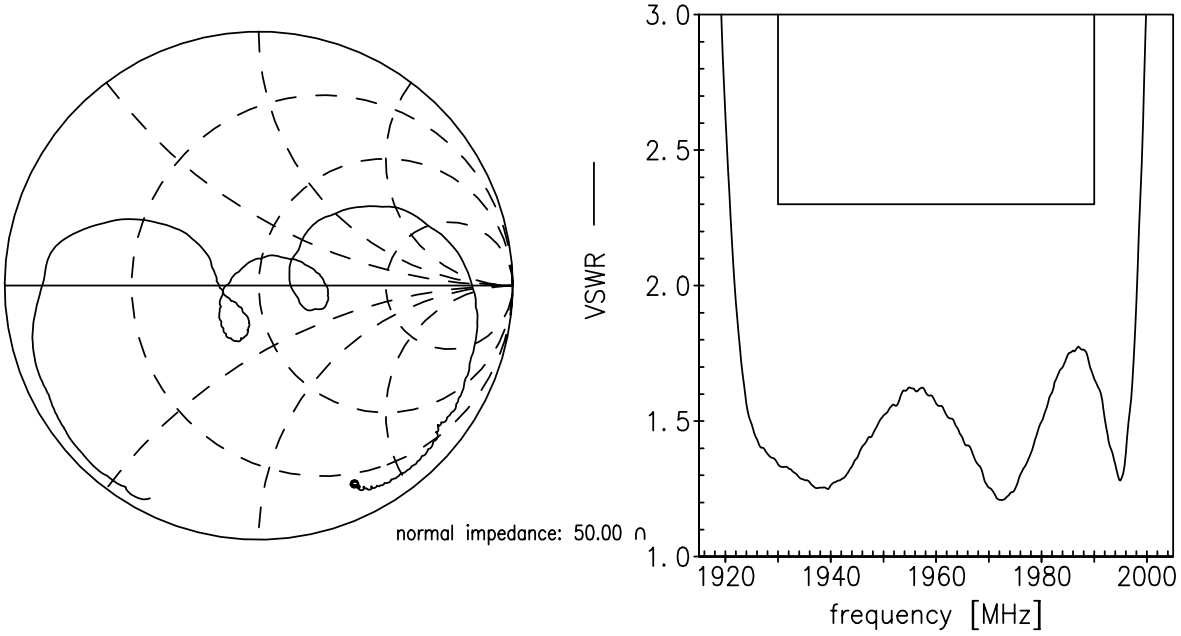
Transfer function Filter 2 (GSM1900) - Wideband



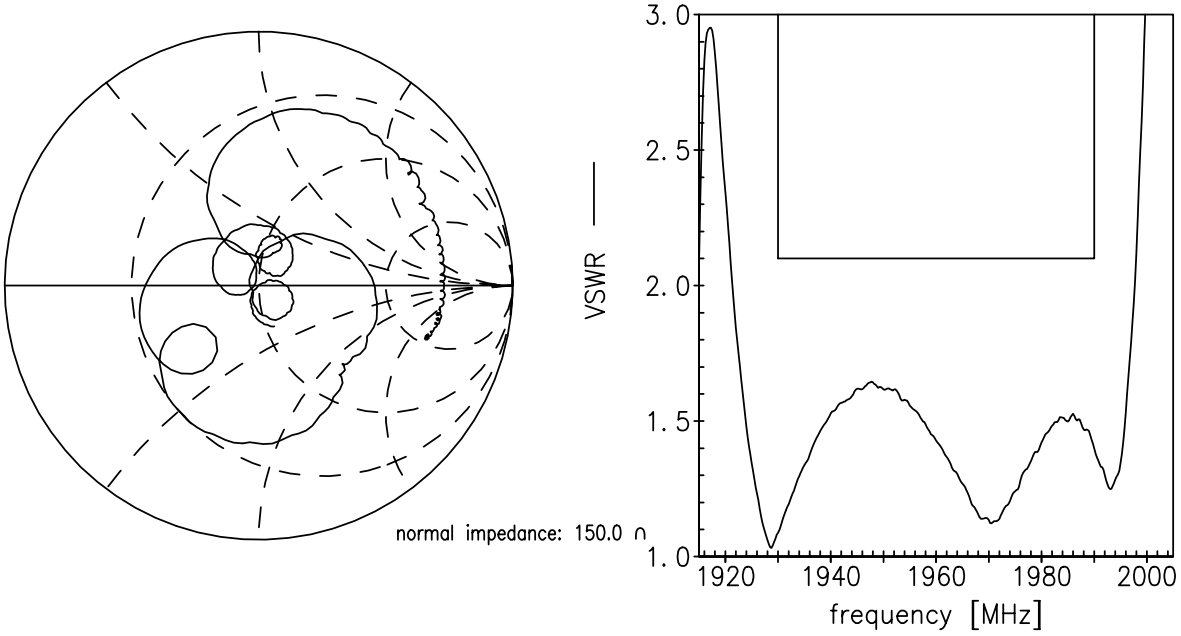
Design goal SMD

Smith charts Filter 2 (GSM1900)

S_{11} function



S_{22} function



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."
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