SAW Components

SAW Rx 4in1 input/output diplex filter

GSM850 / GSM900 / GSM1800 / GSM1900

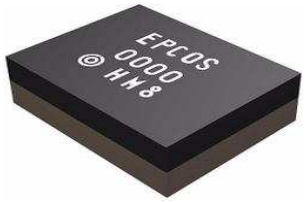
Series/type:	**B9837**
Ordering code:	**B39202B9837P810**
Date:	September 27, 2012
Version:	2.0

SAW Rx 4in1 input/output diplex filter **881.5 / 942.5 / 1842.5 / 1960.0 MHz**

Data sheet SMD

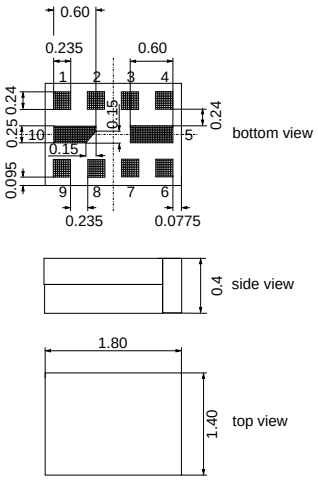
Application

- Low-loss 4in1 RF filter for mobile telephone GSM 1900, GSM 1800, GSM 900 and GSM 850 systems, receive path (Rx)
- Usable passband:
  Filter 1 (GSM 900): 35 MHz
  Filter 2 (GSM 850): 25 MHz
  Filter 3 (GSM 1900): 60 MHz
  Filter 4 (GSM 1800): 75 MHz
- Unbalanced to balanced operation for all filters
- Impedance transformation from 50 Ω to 150 Ω for all filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12



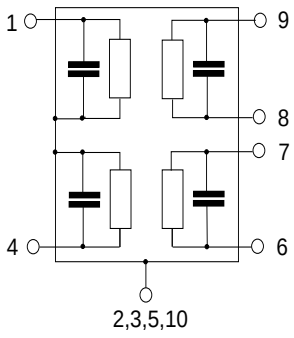
Features

- Package size 1.8 x1.4 x 0.4 mm^3
- RoHS compatible
- Approx. weight 0.004g
- 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 [Diplex Filter 1 & 3]
■	4	Input [Diplex Filter 2 & 4]
■	6,7	Output, balanced [Diplex Filter 3 & 4]
■	8,9	Output, balanced [Diplex Filter 1 & 2]
■	2,3,5,10	Case ground



Characteristics of Filter 1 (GSM 900)

Temperature range for specification: T = -20 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 6.3nH
Terminating load impedance: Z_L = 150 Ω || 21 nH

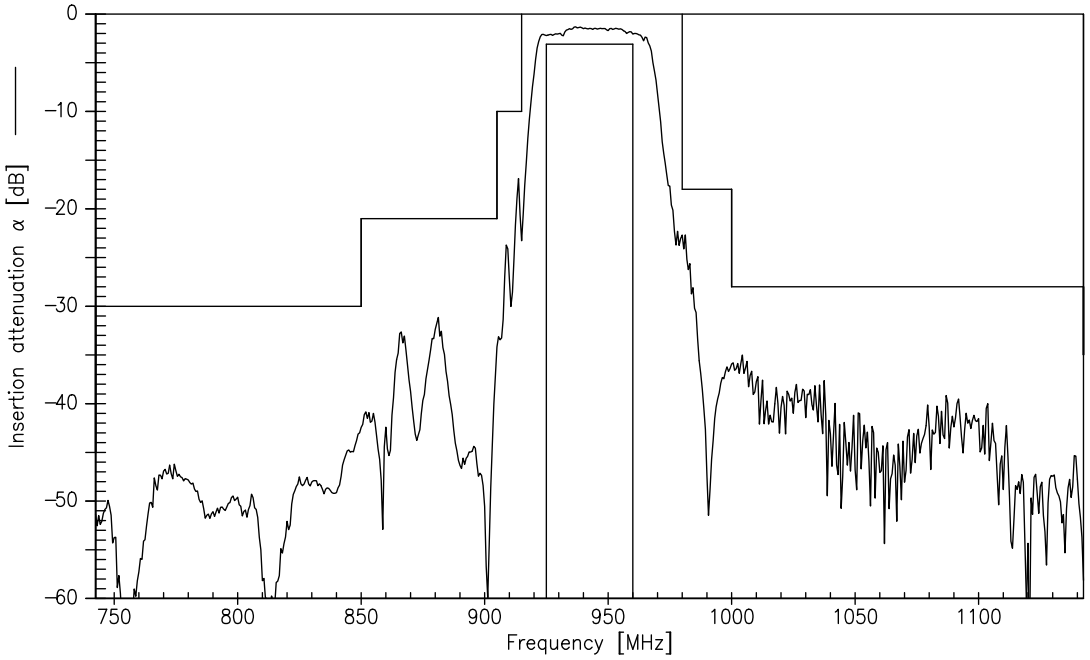
		min.	typ. @25˚C	max.	
Center frequency	f_C	—	942.5	—	MHz
Maximum insertion attenuation	α_{max}				
925.0 ... 960.0 MHz		—	2.2	3.1	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
925.0 ... 960.0 MHz		—	0.9	1.8	dB
Input VSWR					
925.0 ... 960.0 MHz		—	1.8	2.4	
Output VSWR					
925.0 ... 960.0 MHz		—	1.6	2.3	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
925.0 ... 960.0 MHz		17	21	—	dB
Attenuation	α				
10.0 ... 480.0 MHz		45	73	—	dB
480.0 ... 850.0 MHz		30	43	—	dB
850.0 ... 905.0 MHz		21	31	—	dB
905.0 ... 915.0 MHz		10	17	—	dB
980.2 ... 1000.0 MHz		18	23	—	dB
1000.0 ... 1850.0 MHz		28	36	—	dB
1850.0 ... 1920.0 MHz		35	42	—	dB
1920.0 ... 3300.0 MHz		28	35	—	dB
3300.0 ... 6000.0 MHz		28	33	—	dB

Maximum ratings of Filter 1

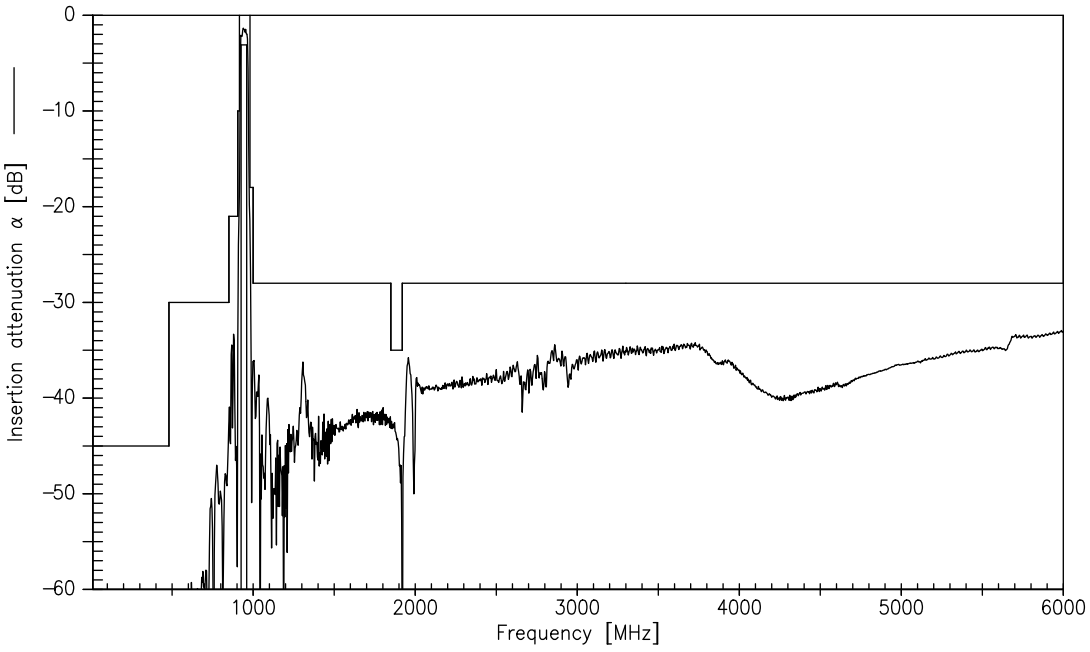
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at				
GSM 850, GSM 900	P_{IN}	13	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	13	dBm	duty cycle 4:8
Tx bands				

1) acc. to JESD22-A115B (machine model), 10 negative & 10 positive pulses.

Transfer function of filter 1 - narrowband

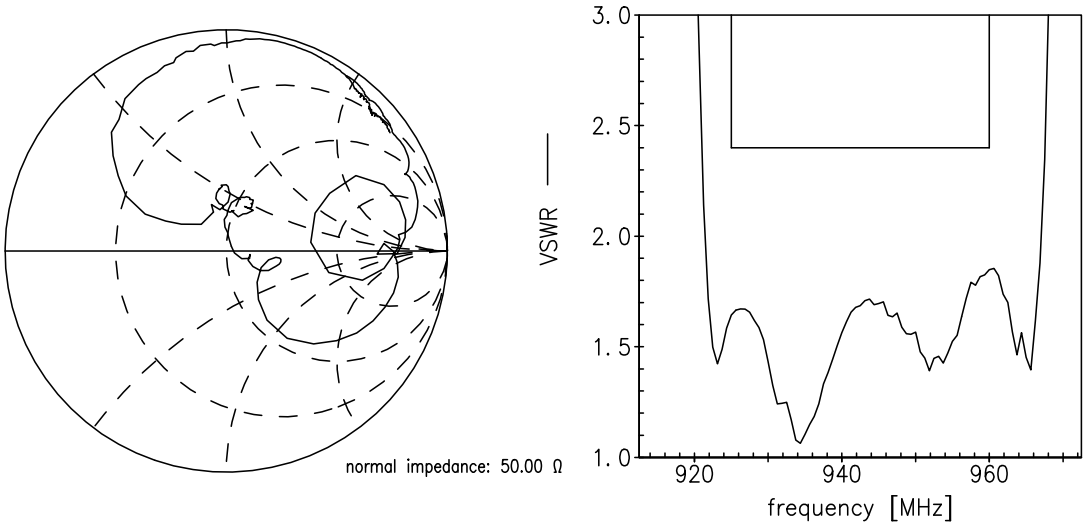


Transfer function of filter 1 - wideband

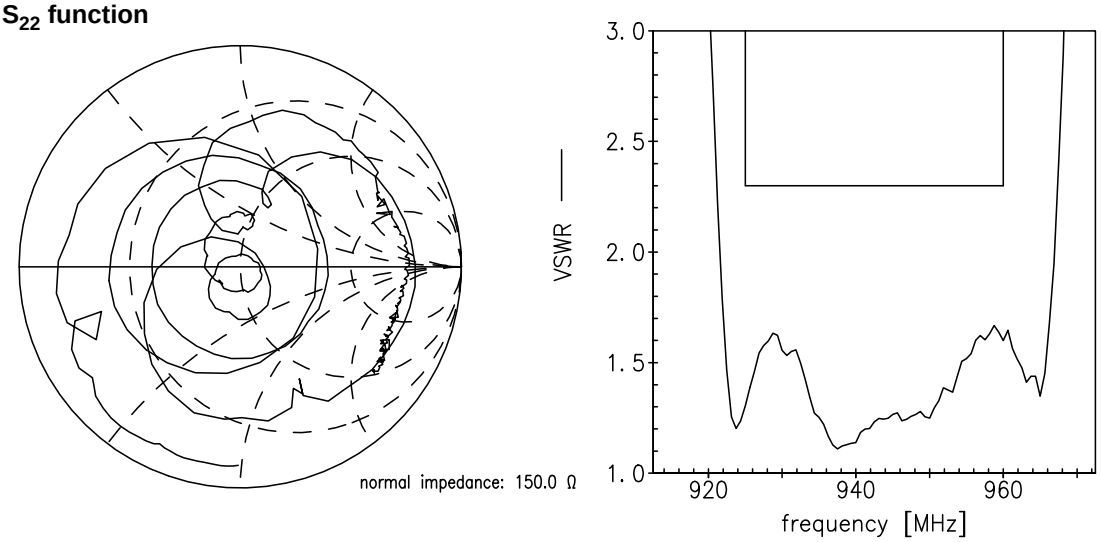


Smith Charts filter 1

S_{11} function



S_{22} function



Characteristics of Filter 2 (GSM 850)

Temperature range for specification: T = -20 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 6.3 nH
Terminating load impedance: Z_L = 150 Ω || 21 nH

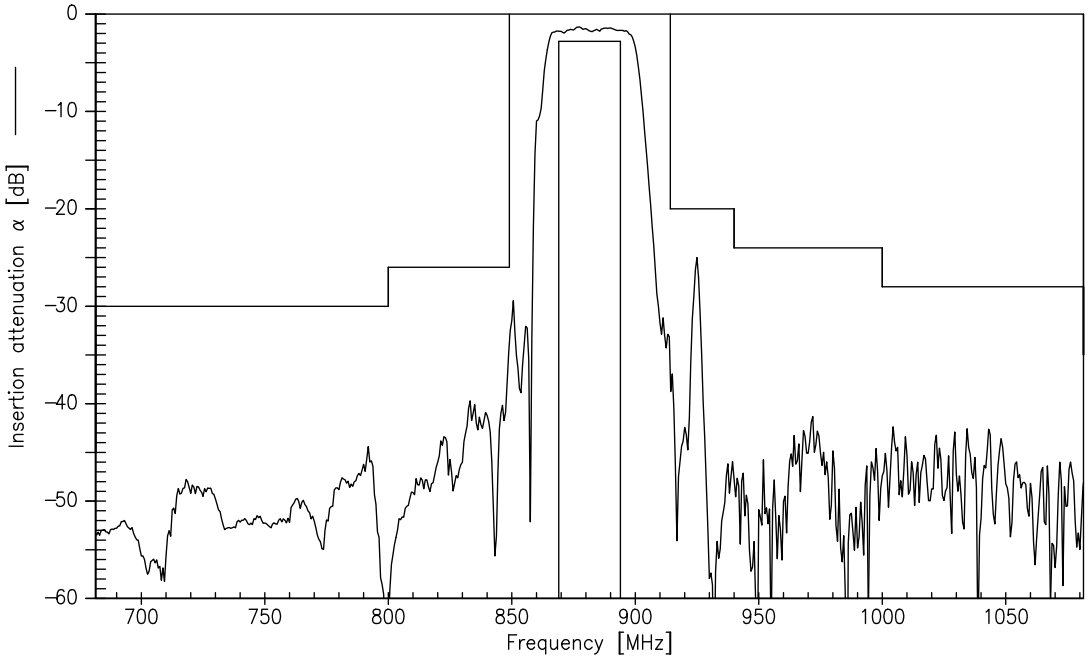
		min.	typ. @25˚C	max.	
Center frequency	f_C	—	881.5	—	MHz
Maximum insertion attenuation	α_{max}				
869.0 ... 894.0 MHz		—	1.8	2.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
869.0 ... 894.0 MHz		—	0.5	1.5	dB
Input VSWR					
869.0 ... 894.0 MHz		—	1.8	2.4	
Output VSWR					
869.0 ... 894.0 MHz		—	1.7	2.3	
Common mode rejection ratio					
869.0 ... 894.0 MHz		17	23	—	dB
Attenuation	α				
10.0 ... 447.0 MHz		45	68	—	dB
447.0 ... 800.0 MHz		30	44	—	dB
800.0 ... 849.0 MHz		26	32	—	dB
914.2 ... 940.0 MHz		20	25	—	dB
940.0 ... 1000.0 MHz		24	41	—	dB
1000.0 ... 1850.0 MHz		28	39	—	dB
1850.0 ... 1920.0 MHz		35	42	—	dB
1920.0 ... 6000.0 MHz		28	40	—	dB

Maximum ratings of Filter 2

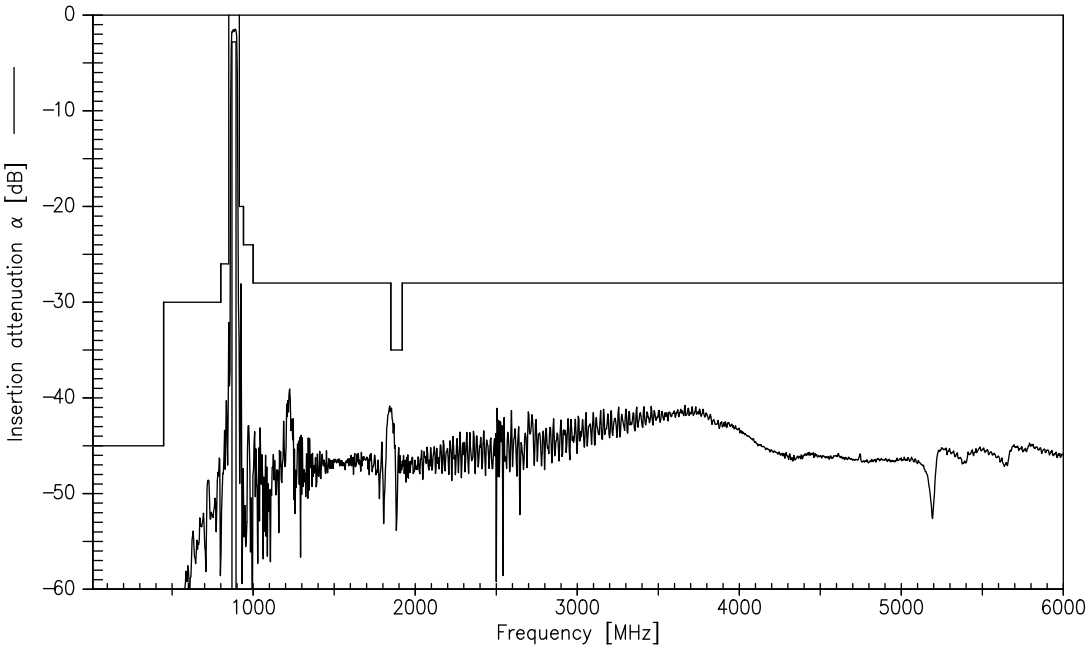
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at				
GSM 850, GSM 900	P_{IN}	13	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	13	dBm	duty cycle 4:8
Tx bands				

1) acc. to JESD22-A115B (machine model), 10 negative & 10 positive pulses.

Transfer function of filter 2 - narrowband

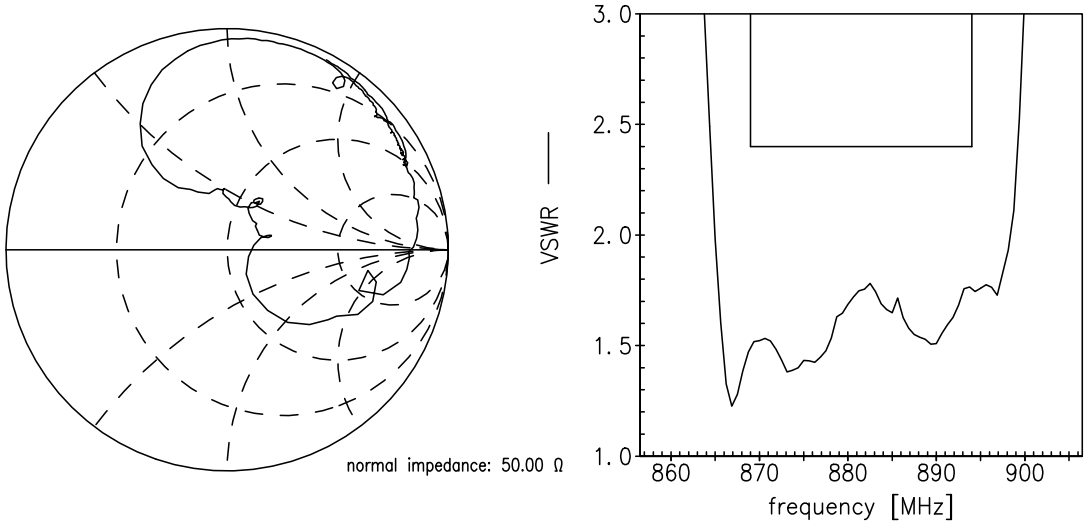


Transfer function of filter 2 - wideband

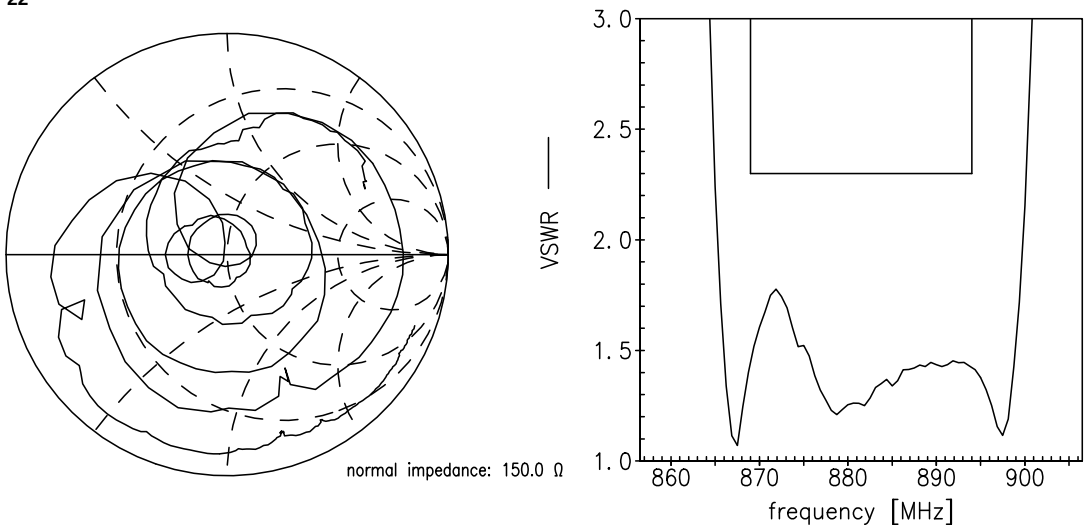


Smith Charts filter 2

S_{11} function



S_{22} function



Characteristics of Filter 3 (GSM1900)

Temperature range for specification: T = –20 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 6.3 nH
Terminating load impedance: Z_L = 150 Ω || 9.0 nH

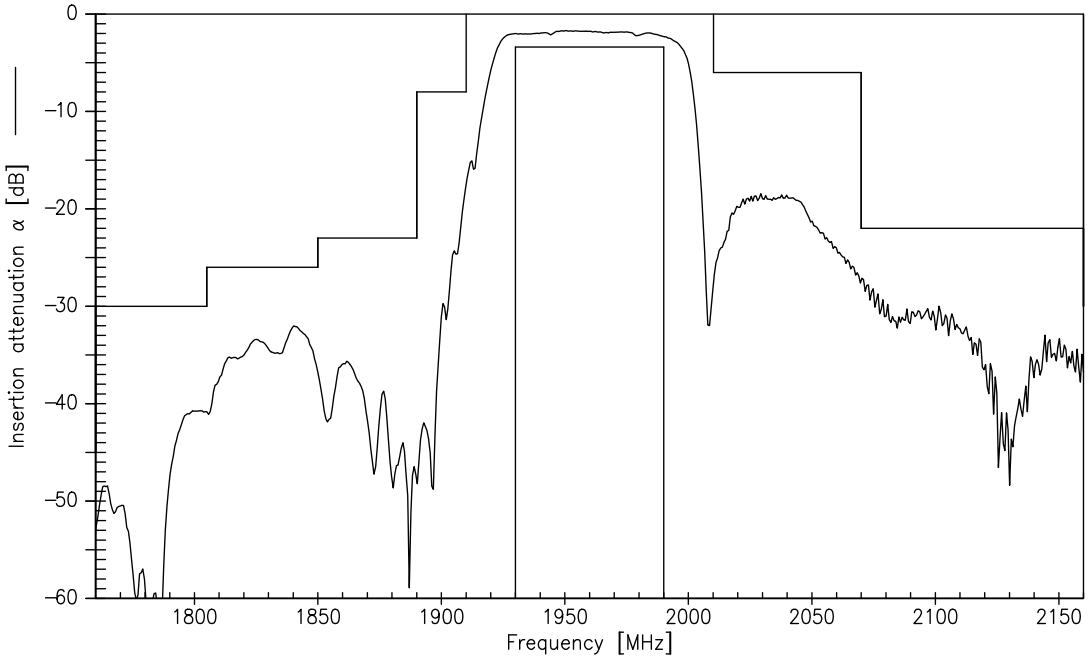
		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	α_{max}				
1930.0 ... 1990.0 MHz		—	2.3	3.4	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1930.0 ... 1990.0 MHz		—	0.6	1.7	dB
Input VSWR					
1930.0 ... 1990.0 MHz		—	1.8	2.4	
Output VSWR					
1930.0 ... 1990.0 MHz		—	2.0	2.5	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1930.0 ... 1990.0 MHz		16	21	—	dB
Attenuation	α				
0.2 ... 1000.0 MHz		45	50	—	dB
1000.0 ... 1510.0 MHz		35	45	—	dB
1510.0 ... 1805.0 MHz		30	40	—	dB
1805.0 ... 1850.0 MHz		26	32	—	dB
1850.0 ... 1890.0 MHz		23	35	—	dB
1890.0 ... 1910.0 MHz		8	18	—	dB
2010.2 ... 2070.0 MHz		6	19	—	dB
2070.0 ... 2400.0 MHz		22	27	—	dB
2400.0 ... 3000.0 MHz		30	40	—	dB
3000.0 ... 6000.0 MHz		30	40	—	dB

Maximum ratings of Filter 3

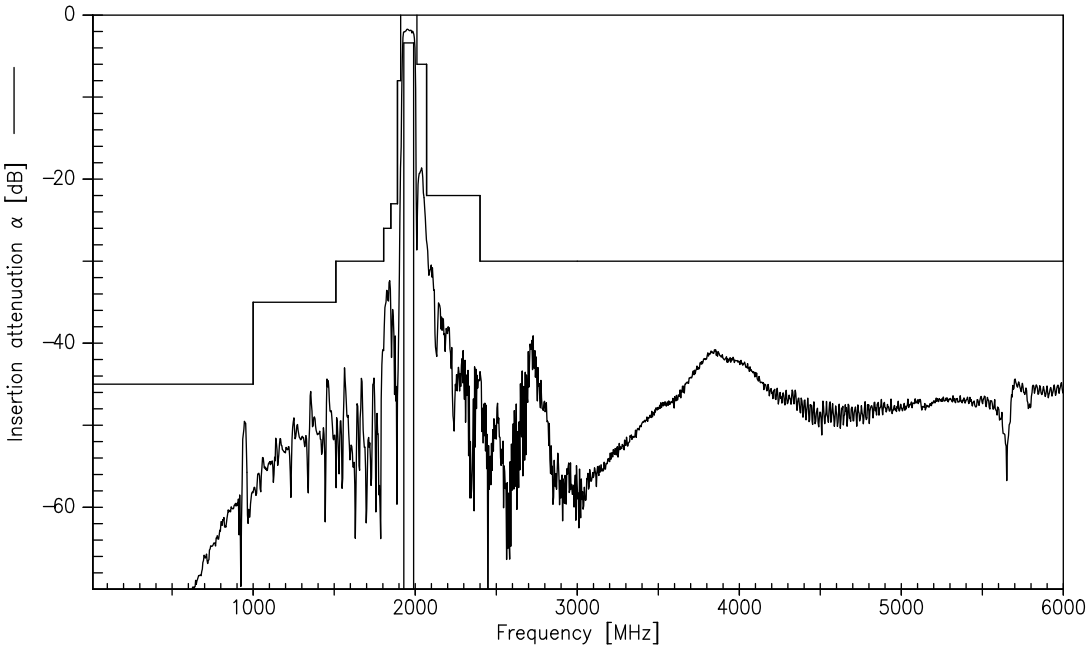
Operable temperature range	T	–40/+85	°C	
Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at				
GSM850, GSM900	P_{IN}	13	dBm	effective power in the on-state,
GSM1800, GSM1900	P_{IN}	13	dBm	duty cycle 4:8
Tx bands				

1) acc. to JESD22-A115B (machine model), 10 negative & 10 positive pulses.

Transfer function of filter 3 - narrowband

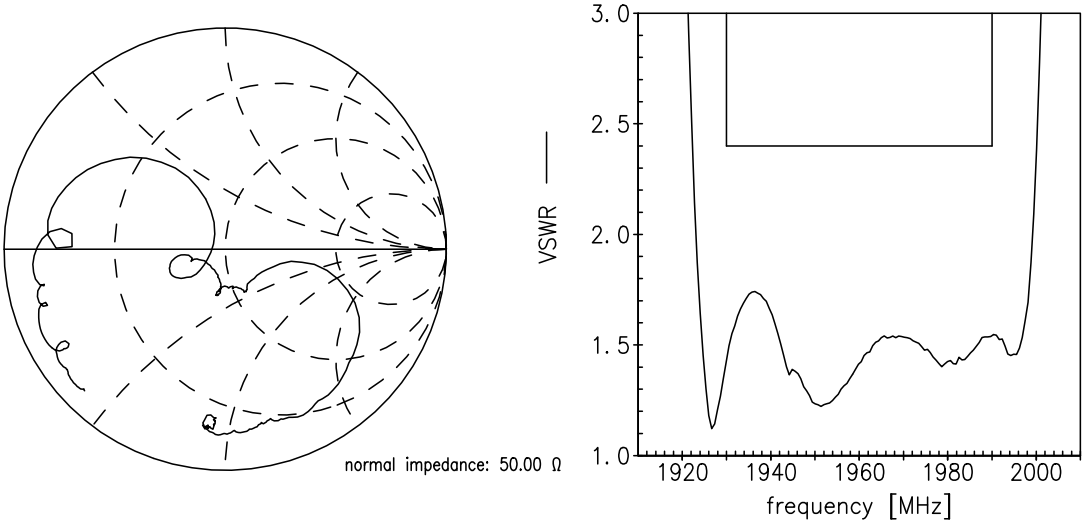


Transfer function of filter 3 - wideband

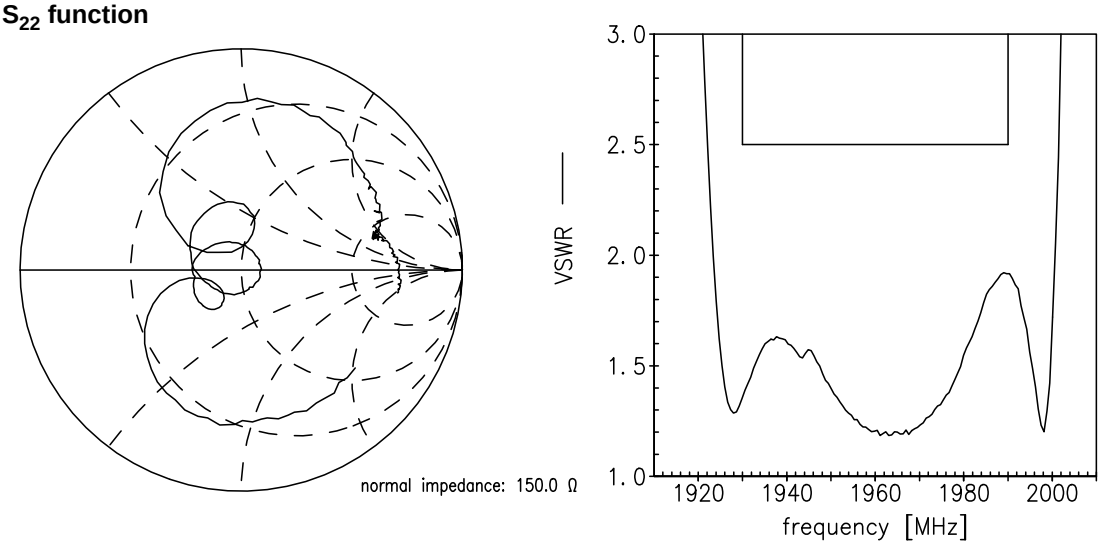


Smith Charts filter 3

S_{11} function



S_{22} function



Characteristics of Filter 4 (GSM1800)

Temperature range for specification: T = –20 ˚C to +85˚C
Terminating source impedance: Z_S = 50 Ω || 6.3 nH
Terminating load impedance: Z_L = 150 Ω || 9.0 nH

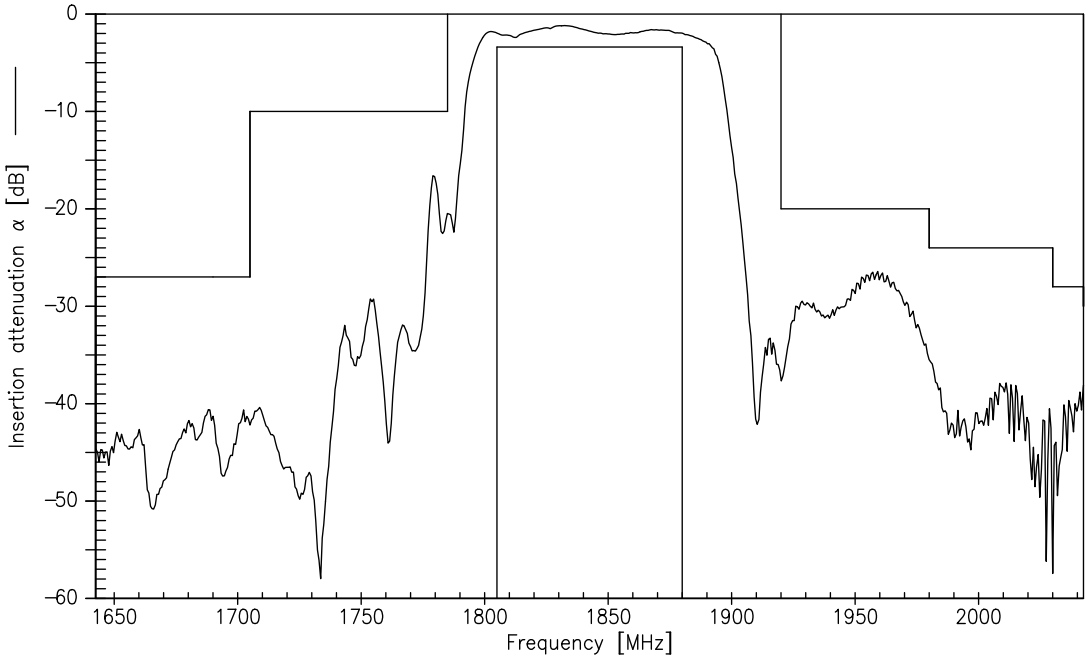
		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}				
1805.0 ... 1880.0 MHz		—	2.4	3.4	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1805.0 ... 1880.0 MHz		—	0.9	2.0	dB
Input VSWR					
1805.0 ... 1880.0 MHz		—	2.0	2.5	
Output VSWR					
1805.0 ... 1880.0 MHz		—	2.0	2.4	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1805.0 ... 1880.0 MHz		17	21	—	dB
Attenuation	α				
10.0 ... 824.0 MHz		45	49	—	dB
824.0 ... 940.0 MHz		41	46	—	dB
940.0 ... 1690.0 MHz		27	40	—	dB
1690.0 ... 1705.0 MHz		27	39	—	dB
1705.0 ... 1785.0 MHz		10	16	—	dB
1920.0 ... 1980.2 MHz		20	27	—	dB
1980.2 ... 2030.0 MHz		24	35	—	dB
2030.0 ... 2650.0 MHz		28	37	—	dB
2650.0 ... 6000.0 MHz		30	39	—	dB

Maximum ratings of filter 4

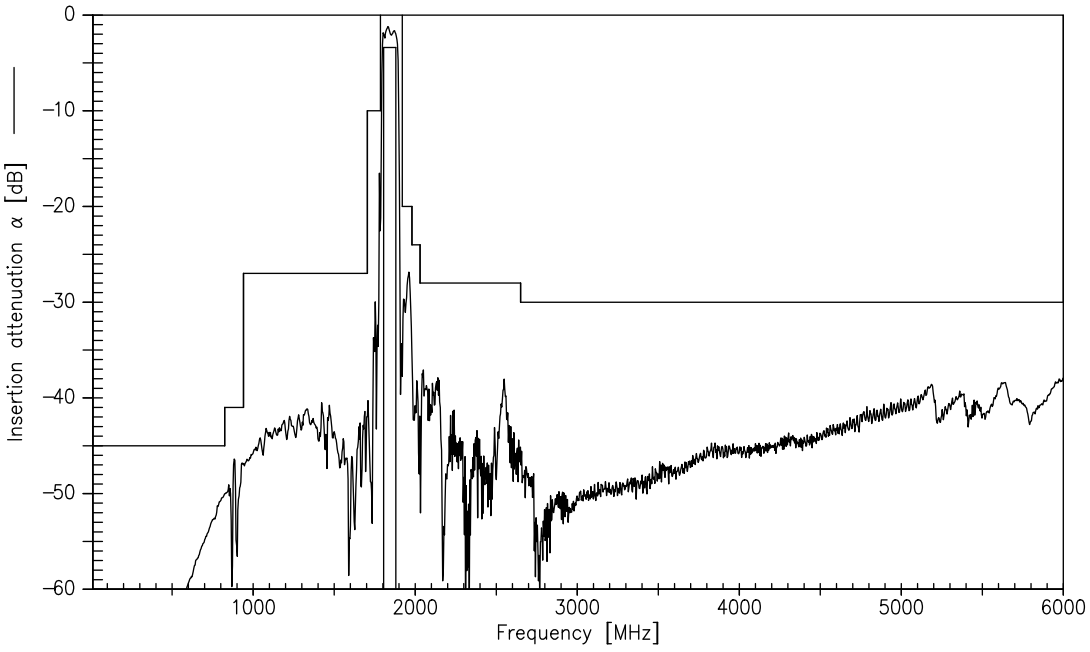
Operable temperature range	T	–40/+85	°C	
Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at				
GSM850, GSM900	P_{IN}	13	dBm	effective power in the on-state,
GSM1800, GSM1900	P_{IN}	13	dBm	duty cycle 4:8
Tx bands				

1) acc. to JESD22-A115B (machine model), 10 negative & 10 positive pulses.

Transfer function of filter 4 - narrowband

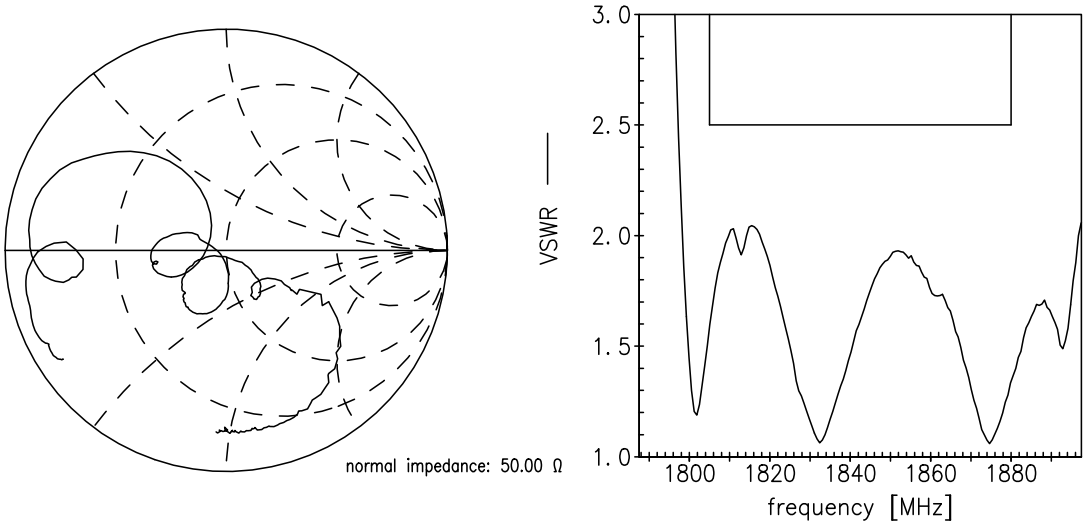


Transfer function of filter 4 - wideband

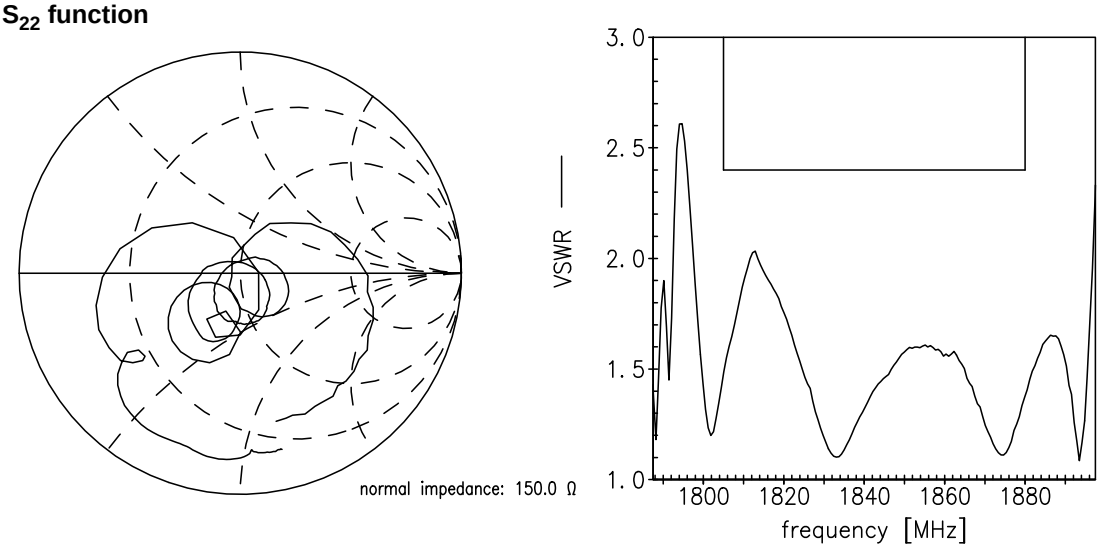


Smith Charts filter 4

S_{11} function



S_{22} function



References

Type	B9837
Ordering code	B39202B9837P810
Marking and package	C61157-A8-A60
Packaging	F61074-V8259-Z000
Date codes	L_1126
S-parameters	B9837_LB_NB.s4p, B9837_LB_WB.s4p, B9837_UB_NB.s4p, B9837_UB_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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm

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