SAW Components

SAW Rx 2in1 input diplex filter

GSM1900 / GSM1800

Series/type:	**B9513**
Ordering code:	**B39202B9513L310**
Date:	May 27, 2010
Version:	2.0

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SAW Rx 2in1 input diplex filter 1960.0 / 1842.5 MHz

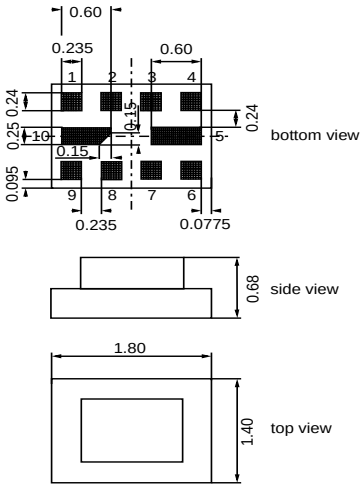
Data sheet SMD

Application

- Low-loss 2in1 RF filter for mobile telephone GSM1900 and GSM1800 systems, receive path (Rx)
- Usable passband:
  Filter 1 (GSM1900): 60 MHz
  Filter 2 (GSM1800): 75 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12

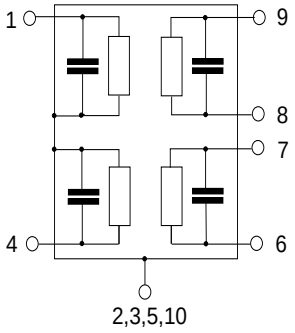
Features

- Package size 1.8 x 1.4 x 0.68 mm³
- Moisture Sensitive Level 3
- RoHS compatible
- Approx. weight 0.006g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **RoHS compatible**
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

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



Characteristics of Filter 1 (GSM1900)

Temperature range for specification: T = -30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 3.3nH
Terminating load impedance: Z_L = 150 Ω || 18nH (balanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	α_{max}				
1930.0 ... 1990.0 MHz		—	2.2	3.0	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1930.0 ... 1990.0 MHz		—	0.9	1.8	dB
Input VSWR					
1930.0 ... 1990.0 MHz		—	1.5	2.0	
Output VSWR					
1930.0 ... 1990.0 MHz		—	1.6	2.1	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1930.0 ... 1990.0 MHz		22[1)]	29	—	dB
Attenuation	α				
10.0 ... 1510.0 MHz		40	53	—	dB
1510.0 ... 1830.0 MHz		30	35	—	dB
1830.0 ... 1850.0 MHz		23	33	—	dB
1850.0 ... 1890.0 MHz		18	30	—	dB
1890.0 ... 1910.0 MHz		9	14	—	dB
2010.0 ... 2070.0 MHz		4	12	—	dB
2070.0 ... 2400.0 MHz		21	33	—	dB
2400.0 ... 6000.0 MHz		30	43	—	dB

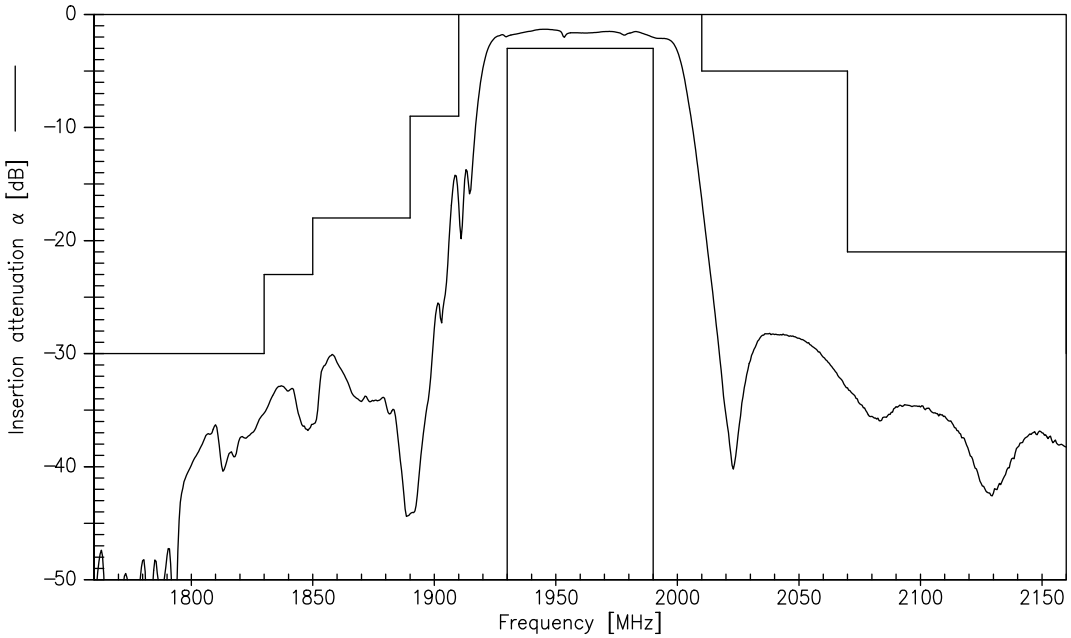
1) A CMRR of 21.9dB corresponds to a phase balance of 7˚ together with an amplitude balance of 0.9dB

Maximum ratings of Filter 1

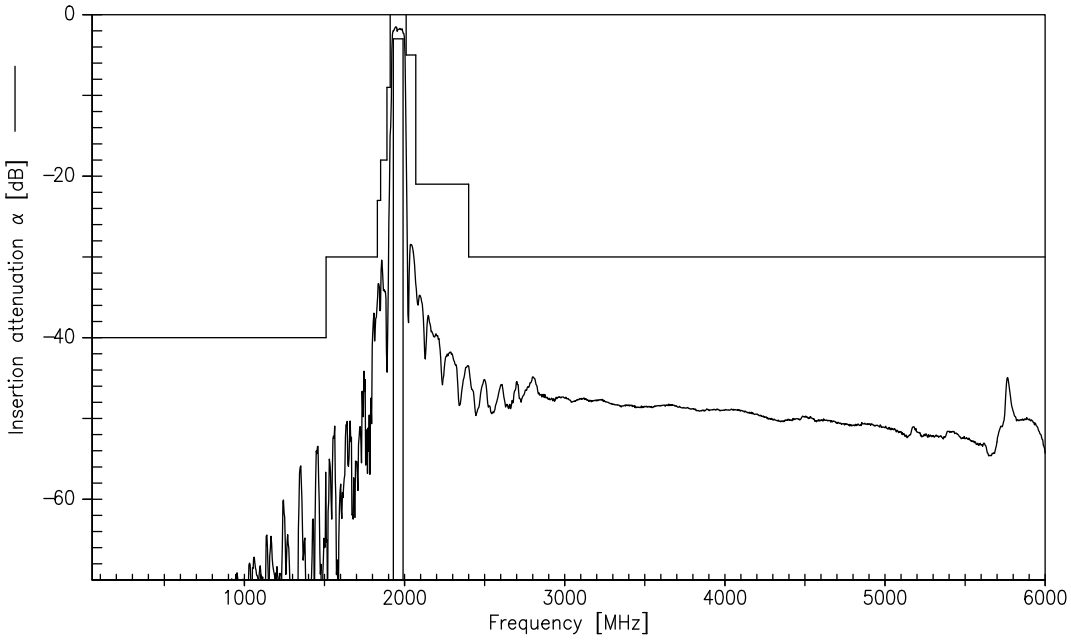
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function Filter 1 (GSM1900)

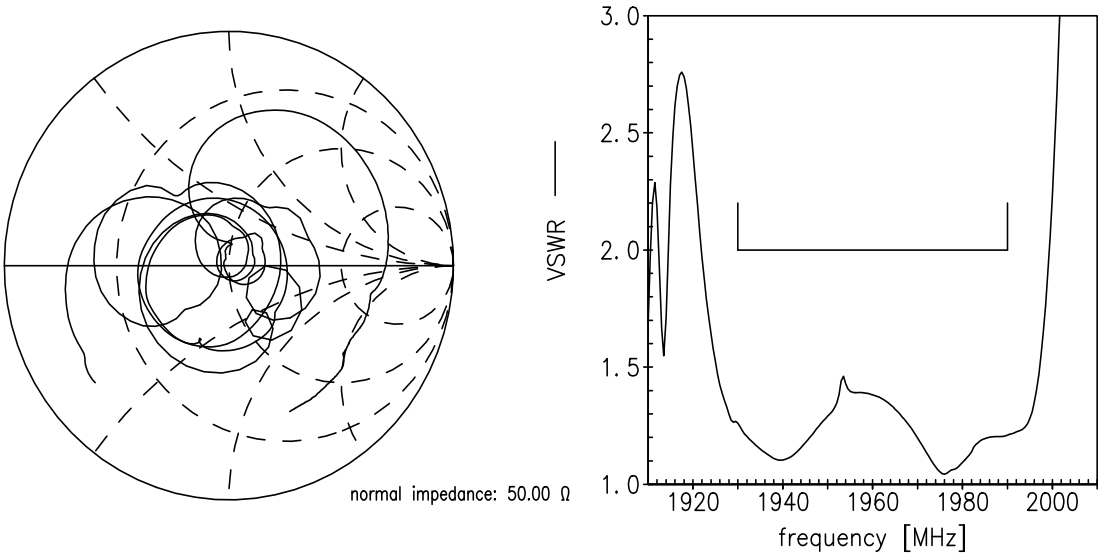


Transfer function Filter 1 (GSM1900) - Wideband

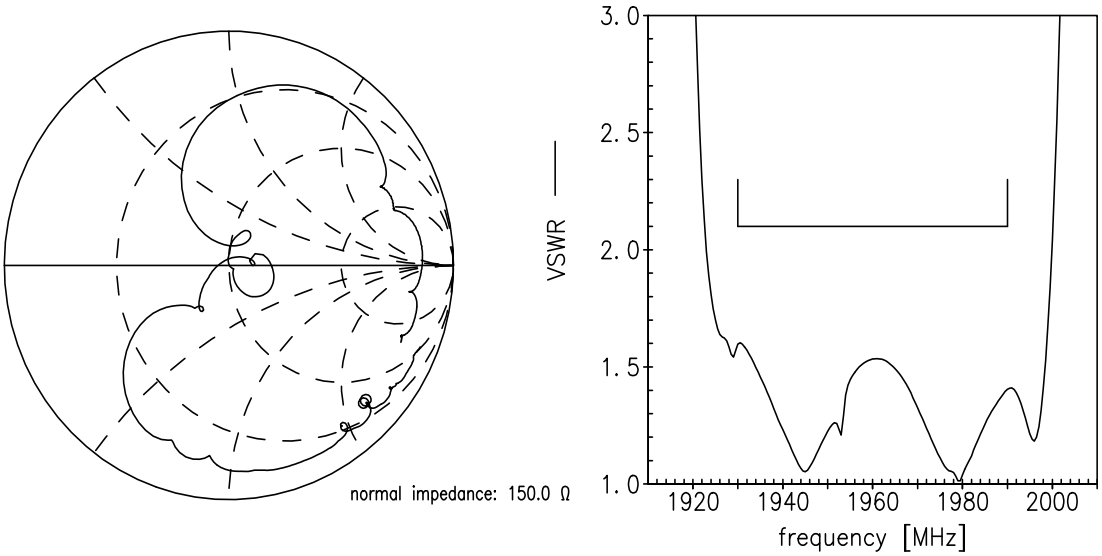


Smith charts Filter 1 (GSM1900)

S_{11} function



S_{22} function



Characteristics of Filter 2 (GSM1800)

Temperature range for specification: T = -30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 3.3nH
Terminating load impedance: Z_L = 150 Ω || 15nH (balanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}				
1805.0 ... 1880.0 MHz		—	2.2	2.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1805.0 ... 1880.0 MHz		—	1.0	1.8	dB
Input VSWR					
1805.0 ... 1880.0 MHz		—	1.5	2.0	
Output VSWR					
1805.0 ... 1880.0 MHz		—	1.7	2.1	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1805.0 ... 1880.0 MHz		20[1)]	24	—	dB
Attenuation	α				
10.0 ... 940.0 MHz		45	62	—	dB
940.0 ... 1705.0 MHz		20	34	—	dB
1705.0 ... 1785.0 MHz		12	18	—	dB
1920.0 ... 1980.0 MHz		17	26	—	dB
1980.0 ... 2030.0 MHz		25	30	—	dB
2030.0 ... 2700.0 MHz		28	35	—	dB
2700.0 ... 6000.0 MHz		30	37	—	dB

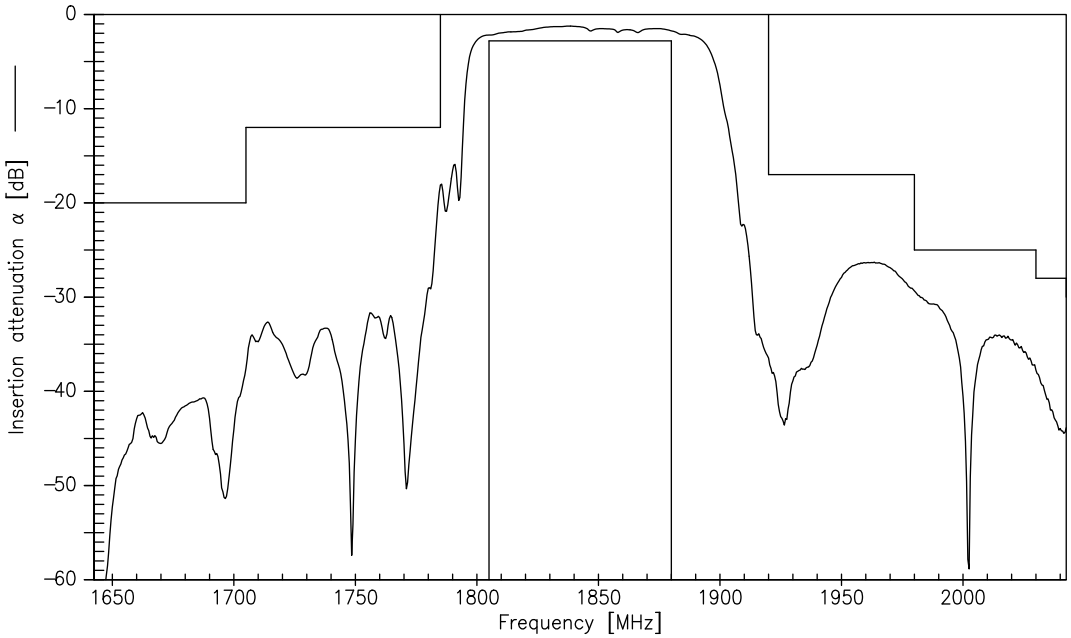
[1)] A CMRR of 19.6dB corresponds to a phase balance of 10˚ together with an amplitude balance of 1.0dB

Maximum ratings of Filter 2

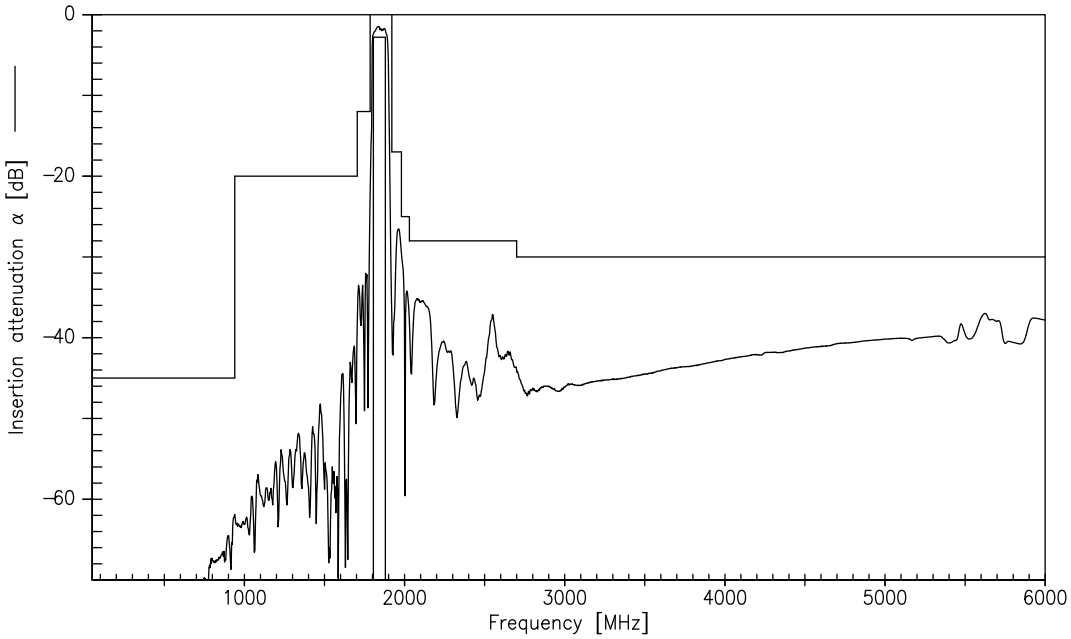
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function Filter 2 (GSM1800)

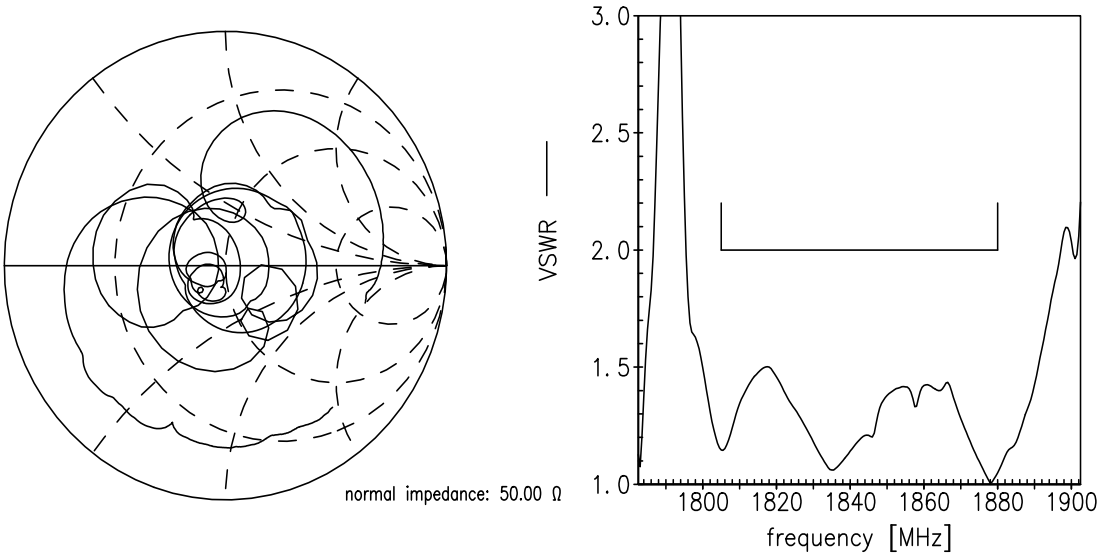


Transfer function Filter 2 (GSM1800) - Wideband

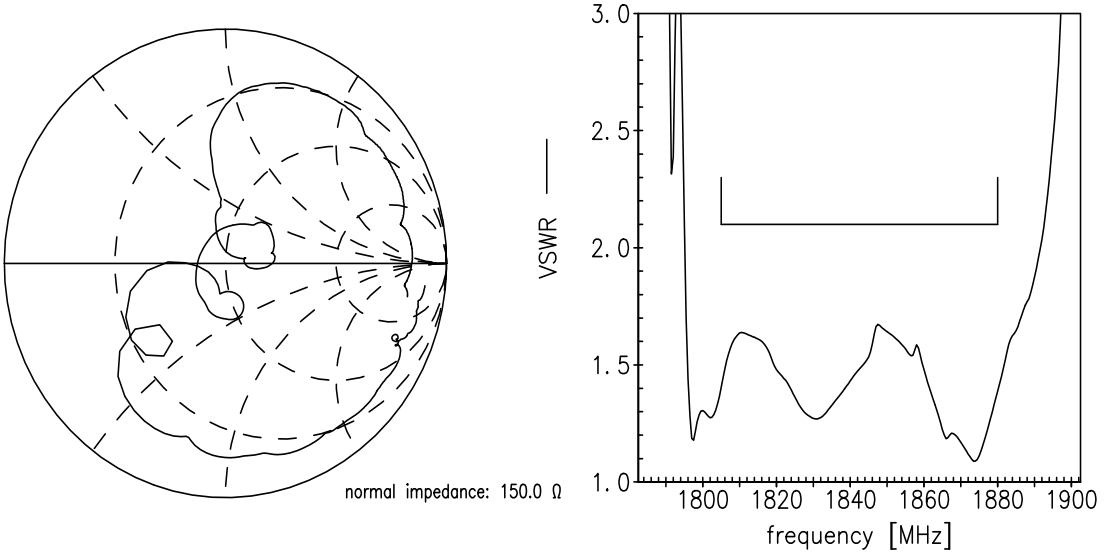


Smith charts Filter 2 (GSM1800)

S_{11} function



S_{22} function



References

Type	B9513
Ordering code	B39202B9513L310
Marking and package	C61157-A7-A153
Packaging	F61074-V8226-Z000
Date codes	L_1126
S-parameters	B9513_LB_NB.s3p B9513_LB_WB.s3p B9513_UB_NB.s3p B9513_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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