SAW Components

SAW Rx 2in1 input diplex filter

GSM1900 / GSM1800

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

SAW Rx 2in1 input diplex filter 1960.0 / 1842.5 MHz

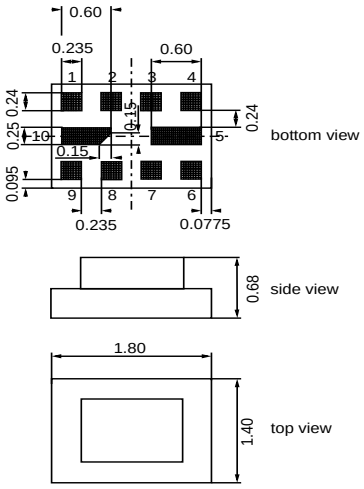
Data sheet SMD

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

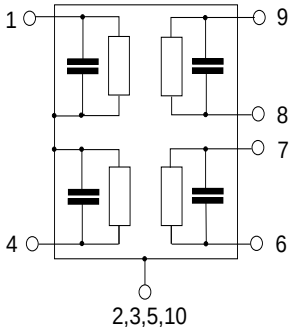
Features

- 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

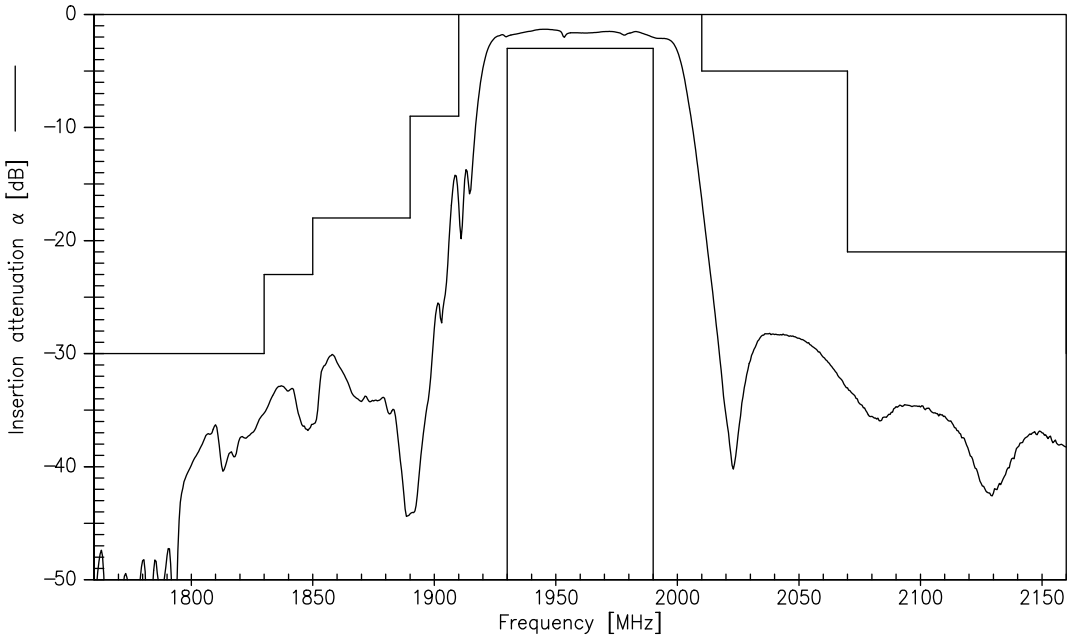
1) A CMRR of 21.9dB corresponds to a phase balance of 7˚ together with an amplitude balance of 0.9dB

Maximum ratings of Filter 1

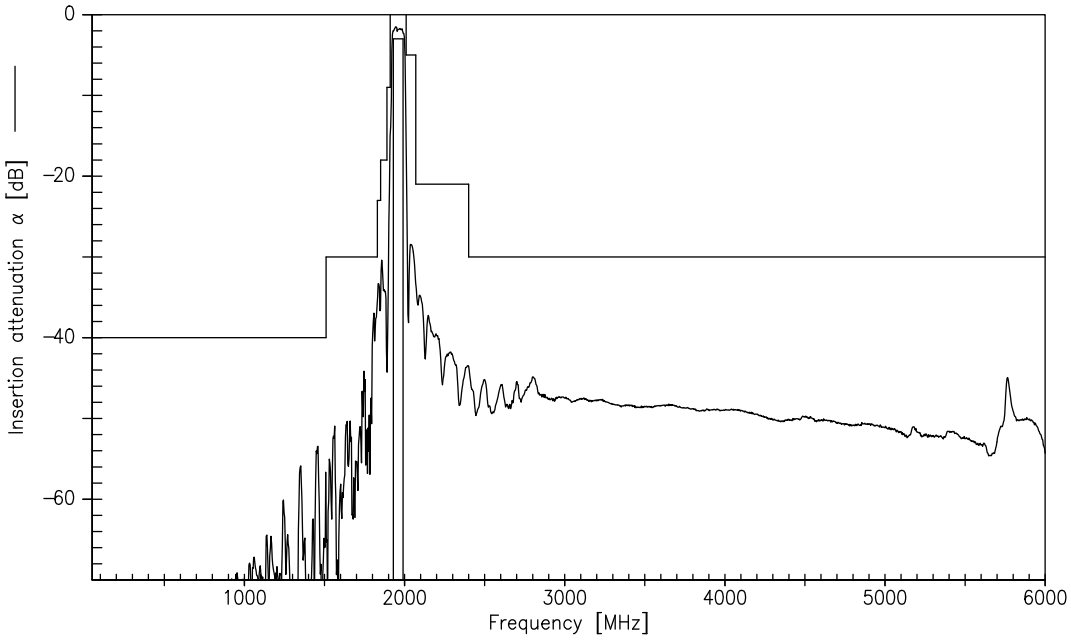
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function Filter 1 (GSM1900)

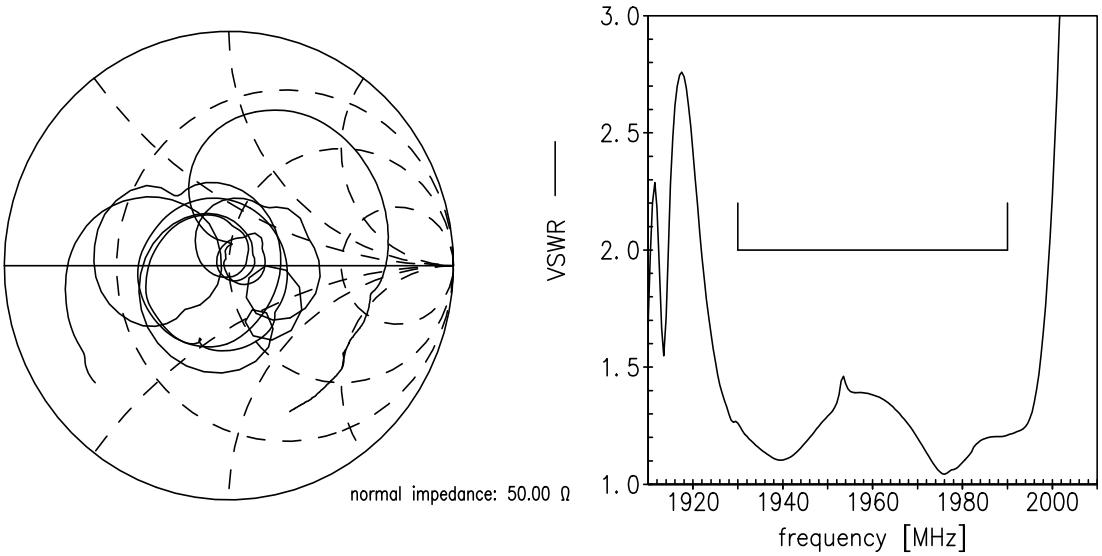


Transfer function Filter 1 (GSM1900) - Wideband

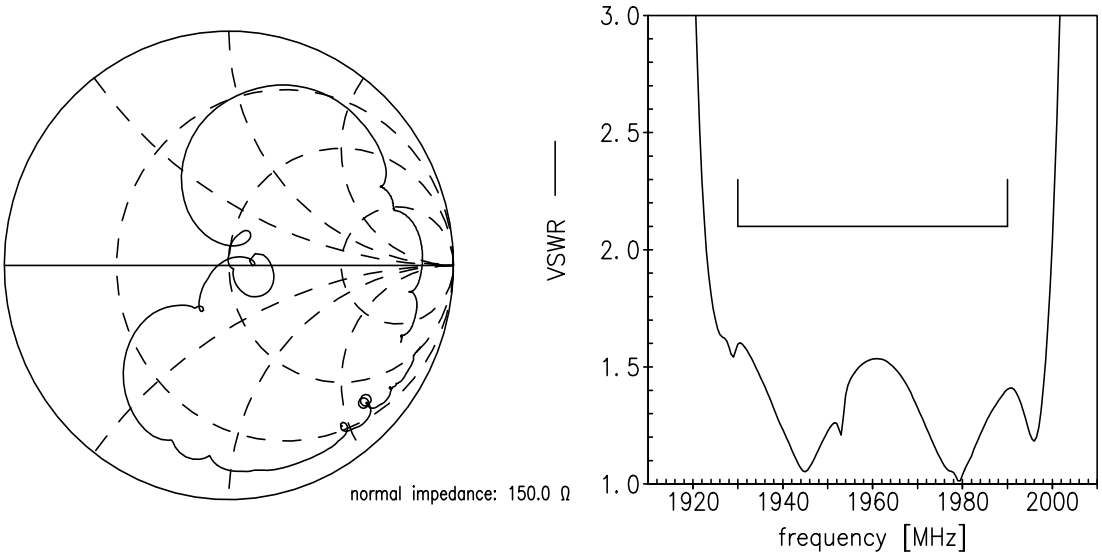


Smith charts Filter 1 (GSM1900)

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

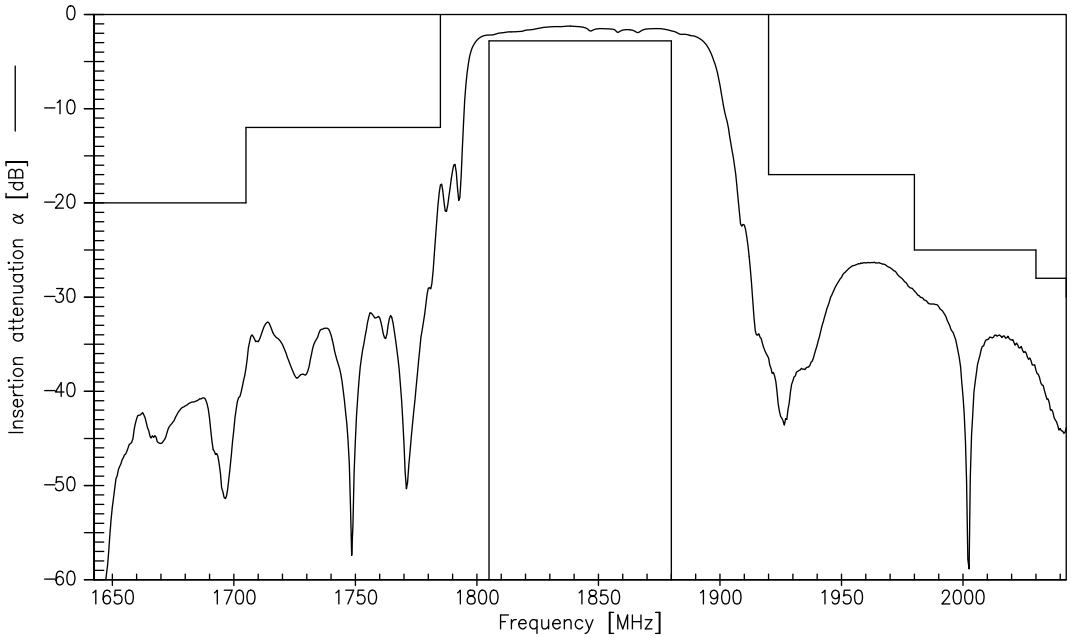
[1)] A CMRR of 19.6dB corresponds to a phase balance of 10˚ together with an amplitude balance of 1.0dB

Maximum ratings of Filter 2

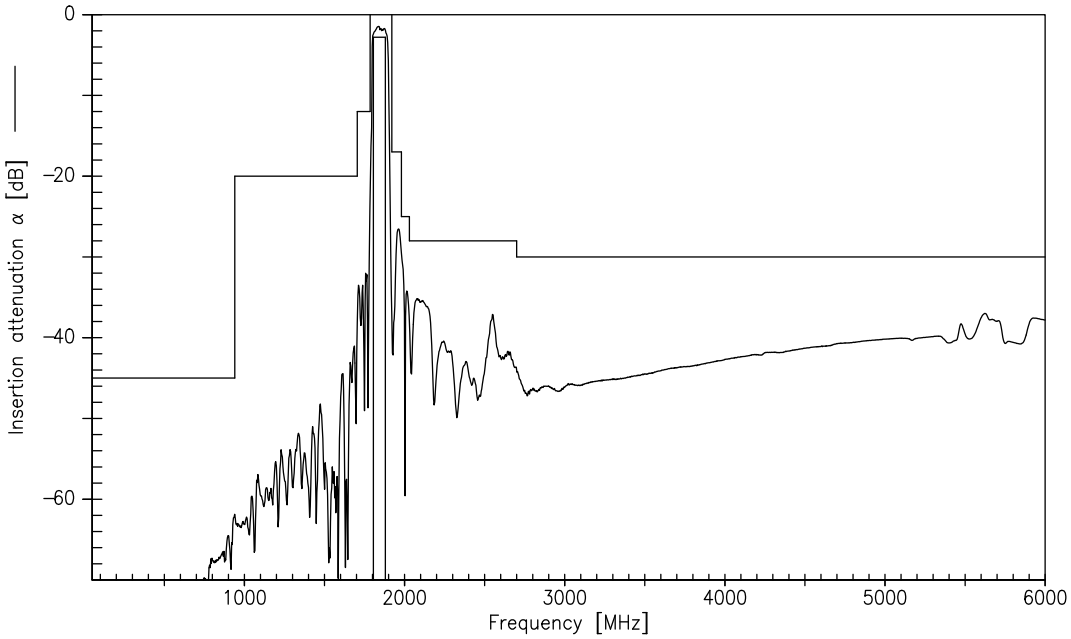
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function Filter 2 (GSM1800)

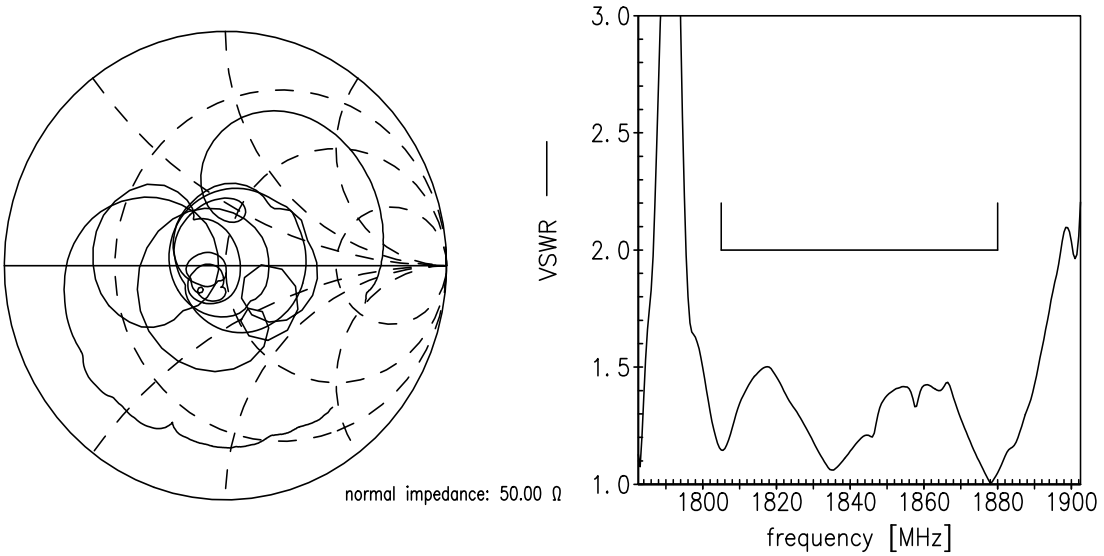


Transfer function Filter 2 (GSM1800) - Wideband

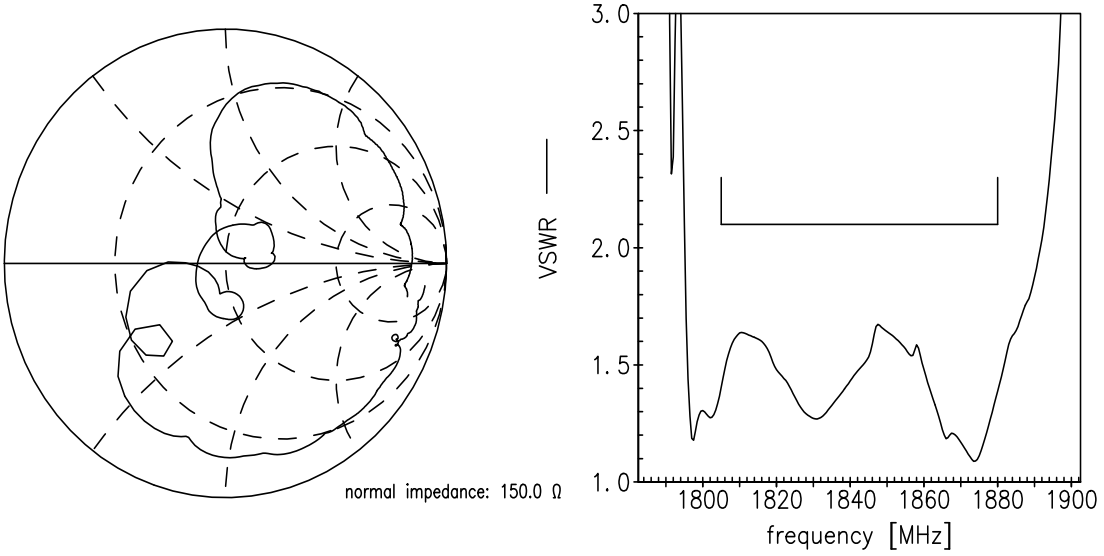


Smith charts Filter 2 (GSM1800)

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."
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