SAW Components

SAW Rx 2in1 output diplex filter

GSM 850 / GSM 900

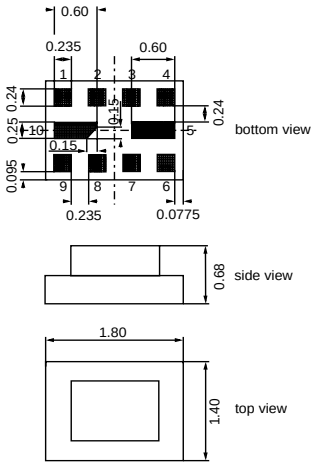
Series/type:	**B9509**
Ordering code:	**B39941B9509L310**
Date:	January 30, 2009
Version:	2.0

Application

- Low-loss 2in1 RF filter for mobile telephone GSM 900 and GSM 850 systems, receive path (Rx)
- Usable passband:
  Filter 1 (GSM 800): 25 MHz
  Filter 2 (GSM 900): 35 MHz
- Unbalanced to balanced operation for all filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12

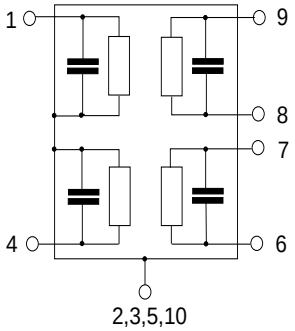
Features

- Package size 1.8 x 1.4 x 0.68 mm^3
- Package code QCS10V
- RoHS compatible
- Approx. weight 0.006 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



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



Characteristics of filter 1 (GSM 850)

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

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	881.5	—	MHz
Maximum insertion attenuation	α_{max}				
869.0 ... 894.0 MHz		—	1.8[1)]	2.6	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
869.0 ... 894.0 MHz		—	0.5	1.3	dB
Input VSWR					
869.0 ... 894.0 MHz		—	1.9	2.3	
Output VSWR					
869.0 ... 894.0 MHz		—	1.8	2.3	
Common mode rejection ratio					
869.0 ... 894.0 MHz		19	24	—	dB
Attenuation	α				
10.0 ... 447.0 MHz		45	54	—	dB
447.0 ... 849.0 MHz		30	38	—	dB
914.2 ... 1000.0 MHz		24	30	—	dB
1000.0 ... 1850.0 MHz		28	40	—	dB
1850.0 ... 1920.0 MHz		40	61	—	dB
1920.0 ... 6000.0 MHz		35	39	—	dB

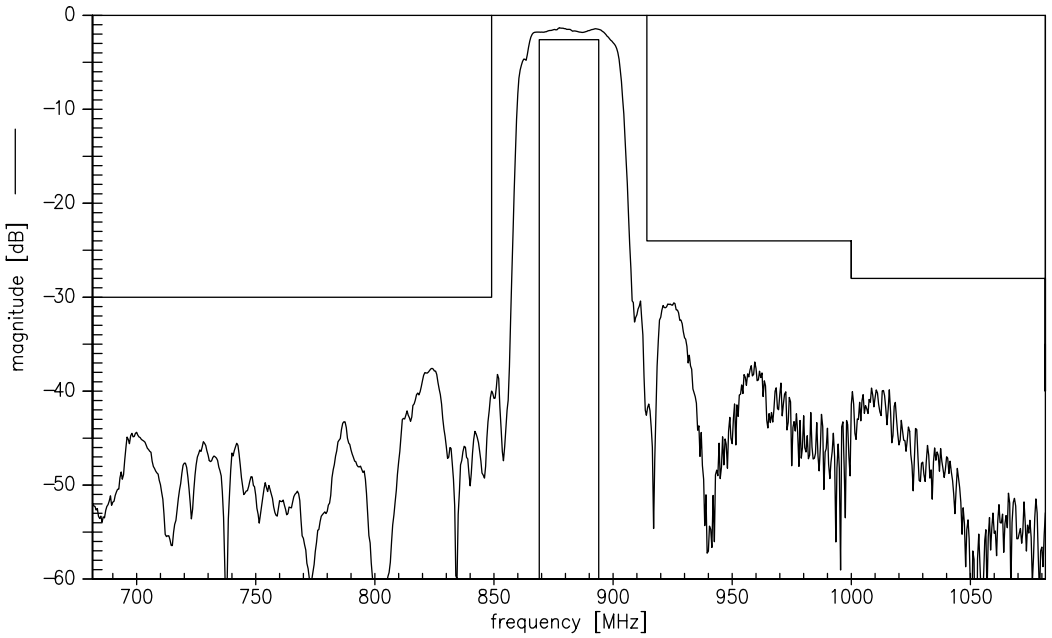
1) Typical value excluding PCB losses.

Maximum ratings of filter 1

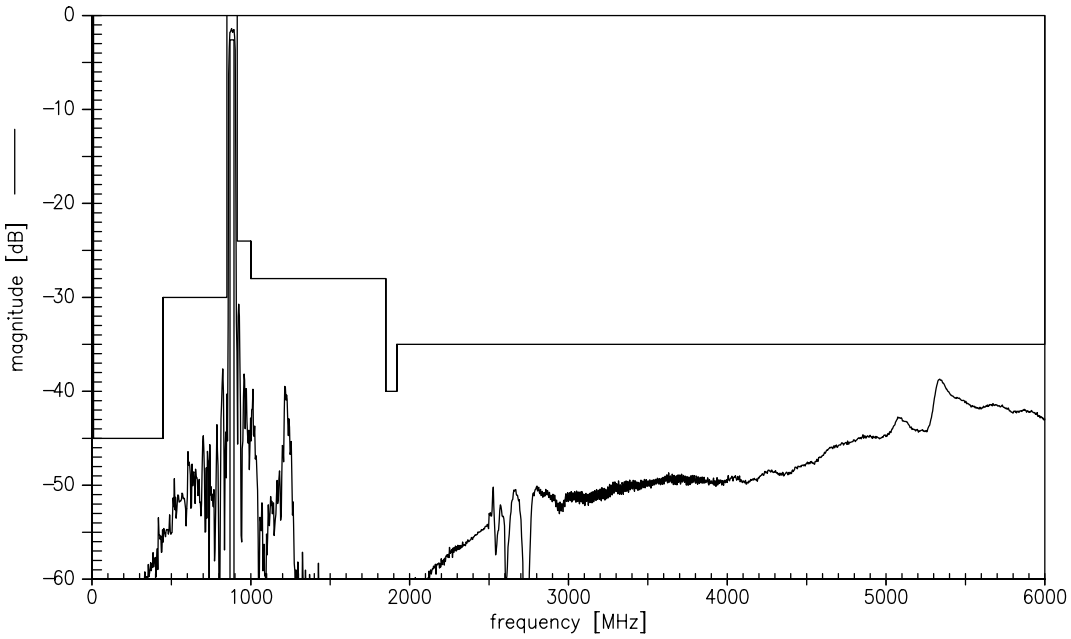
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function of filter 1

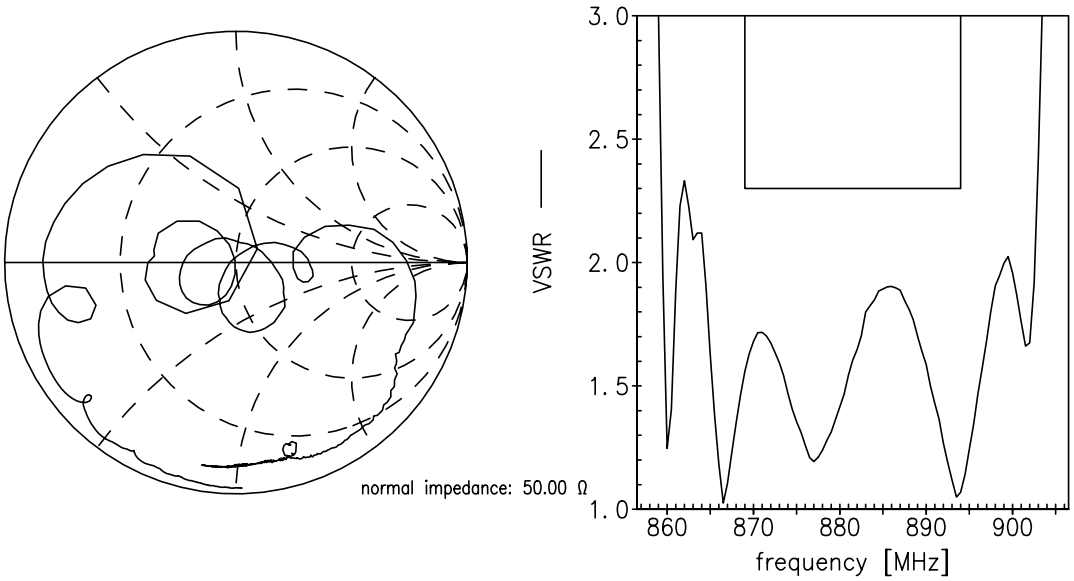


Transfer function of filter 1 - wideband

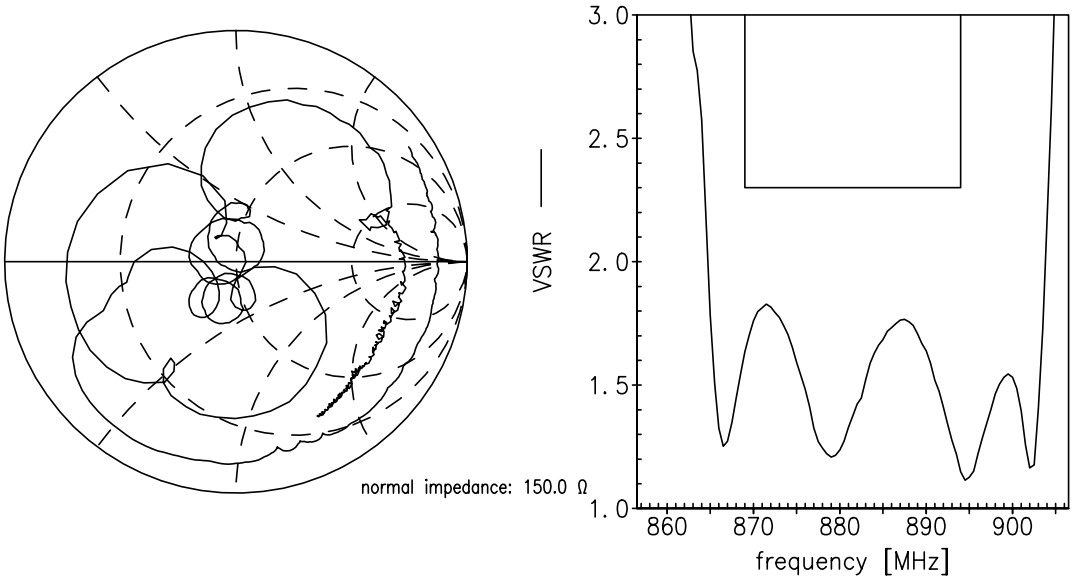


Smith Charts filter 1

S_{11} function



S_{22} function



Characteristics of filter 2 (GSM 900)

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

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	942.5	—	MHz
Maximum insertion attenuation	α_{max}				
925.0 ... 960.0 MHz		—	2.2[1)]	2.9	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
925.0 ... 960.0 MHz		—	0.9	1.6	dB
Input VSWR					
925.0 ... 960.0 MHz		—	1.8	2.1	
Output VSWR					
925.0 ... 960.0 MHz		—	1.8	2.1	
Common mode rejection ratio					
925.0 ... 960.0 MHz		18	22	—	dB
Attenuation	α				
10.0 ... 480.0 MHz		45	54	—	dB
480.0 ... 905.0 MHz		30	36	—	dB
905.0 ... 915.0 MHz		15	23	—	dB
980.2 ... 1000.0 MHz		25	28	—	dB
1000.0 ... 1850.0 MHz		28	33	—	dB
1850.0 ... 1920.0 MHz		40	49	—	dB
1920.0 ... 6000.0 MHz		35	43	—	dB

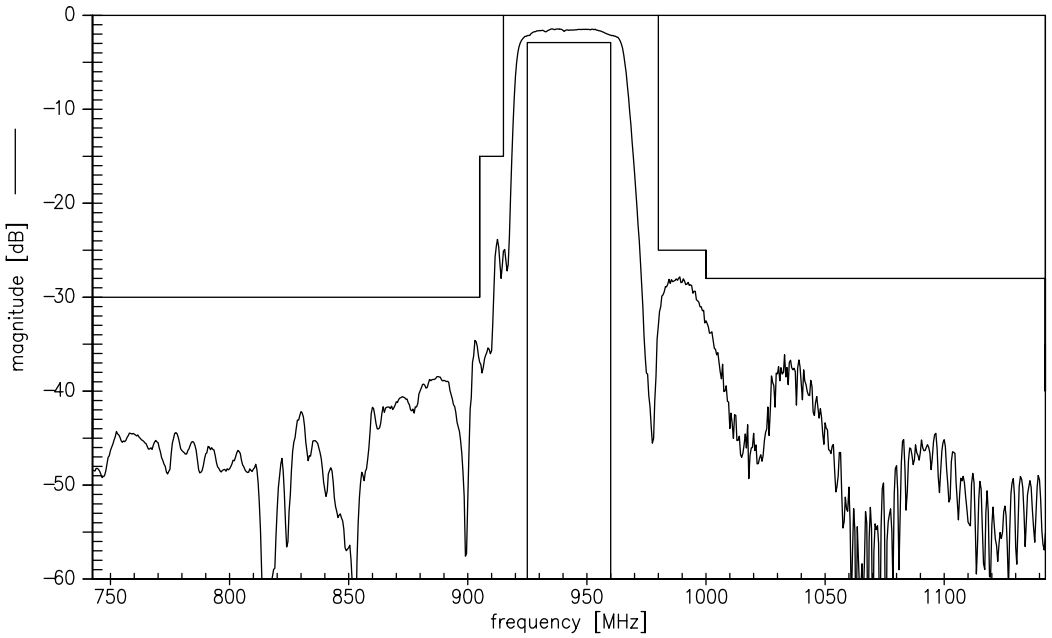
[1)] Typical value excluding PCB losses.

Maximum ratings of filter 2

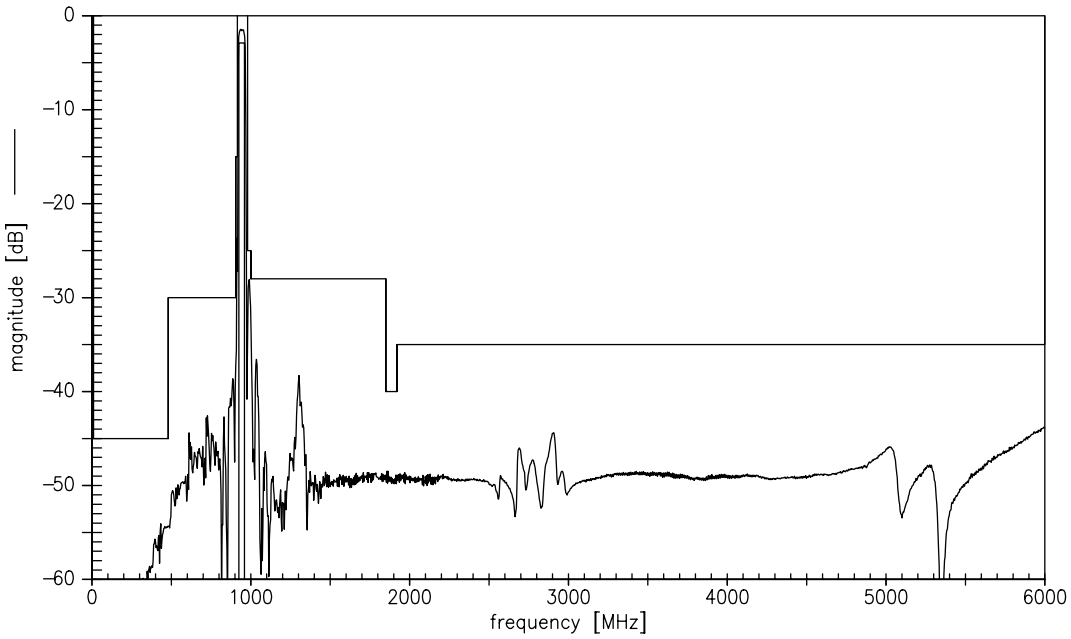
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function of filter 2

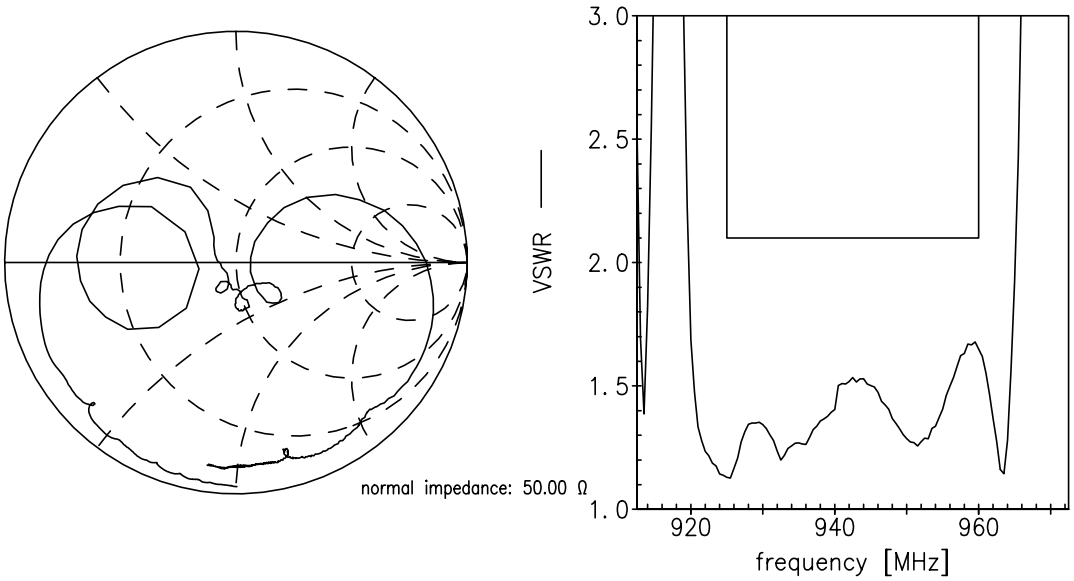


Transfer function of filter 2 - wideband

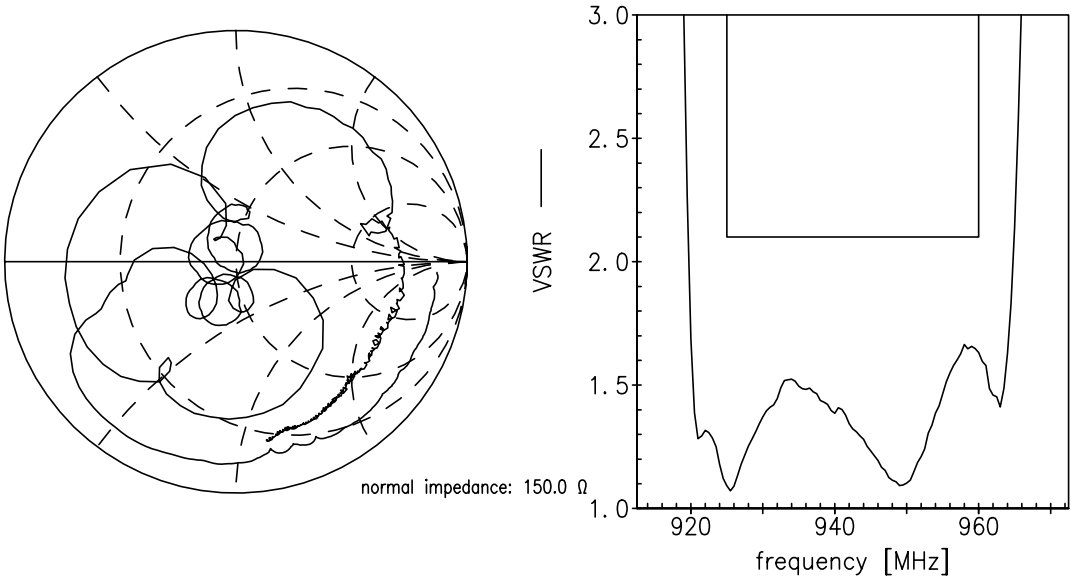


Smith Charts filter 2

S_{11} function



S_{22} function



References

Type	B9509
Ordering code	B39941B9509L310
Marking and package	C61157-A7-A153
Packaging	F61074-V8226-Z000
Date codes	L_1126
S-parameters	B9509_LB_NB.s3p B9509_LB_WB.s3p B9509_UB_NB.s3p B9509_UB_WB.s3p
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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