



SAW Components

SAW Rx 2in1 filter

GSM 900 / GSM 850

Series/type:	B9721
Ordering code:	B39901B9721F210
Date:	October 16, 2007
Version:	2.0

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SAW Rx 2in1 filter

942.5 / 881.5 MHz

Data Sheet



Revision History: Changes compared to previous iteration issue

ISSUE	ORIGINATOR	DETAIL SPEC CHANGES	DATE
2.0	M. Schmachtl	initial release	16.10.2007

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Data Sheet

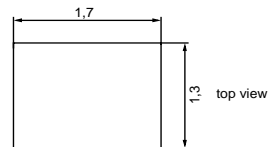
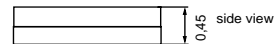
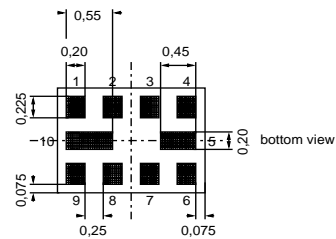


Application

- Low-loss 2in1 RF filter for mobile telephone GSM 900 and GSM 850 systems, receive path (Rx)
- Usable passband:
 - Filter 1 (GSM 900): 35 MHz
 - Filter 2 (GSM 850): 25 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

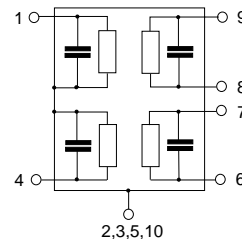
Features

- Package size 1.7 x 1.3 x 0.45 mm³
- Package code QCS10M
- RoHS compatible
- Approx. weight 0.004g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**



Pin configuration

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





Data Sheet



Characteristics of Filter 1 (GSM900)

Temperature range for specification: $T = -20$ to $+75$ °C
 Terminating source impedance: $Z_S = 50\Omega$ (unbalanced)
 Terminating load impedance: $Z_L = 150\Omega$ (balanced) || 72nH

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	942.5	—	MHz
Maximum insertion attenuation	α_{max}	—	1.4	2.2	dB
925.0 ... 960.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.5	1.5	dB
925.0 ... 960.0 MHz					
Input VSWR		—	1.6	2.0	
925.0 ... 960.0 MHz					
Output VSWR		—	1.6	2.0	
925.0 ... 960.0 MHz					
Output amplitude balance (S_{31}/S_{21})		-1.0	-0.7/0.3	1.0	dB
925.0 ... 960.0 MHz					
Output phase balance ($\phi(S_{31})-\phi(S_{21}))+180^\circ$		-10	-3/1	10	°
925.0 ... 960.0 MHz					
Attenuation	α				
10.0 ... 480.0 MHz		45	54	—	dB
480.0 ... 900.0 MHz		30	41	—	dB
900.0 ... 905.0 MHz		27	31	—	dB
905.0 ... 915.0 MHz		20	31	—	dB
980.0 ... 1000.0 MHz		25	30	—	dB
1000.0 ... 1850.0 MHz		28	32	—	dB
1850.0 ... 1920.0 MHz		40	43	—	dB
1920.0 ... 2400.0 MHz		28	40	—	dB
2400.0 ... 2500.0 MHz		35	40	—	dB
2500.0 ... 2775.0 MHz		28	39	—	dB
2775.0 ... 2880.0 MHz		35	39	—	dB
2880.0 ... 3700.0 MHz		28	39	—	dB
3700.0 ... 3840.0 MHz		38	42	—	dB
3840.0 ... 4625.0 MHz		28	41	—	dB
4625.0 ... 4800.0 MHz		38	41	—	dB
4800.0 ... 5150.0 MHz		28	40	—	dB
5150.0 ... 6000.0 MHz		35	39	—	dB

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Data Sheet



Maximum ratings of Filter 1

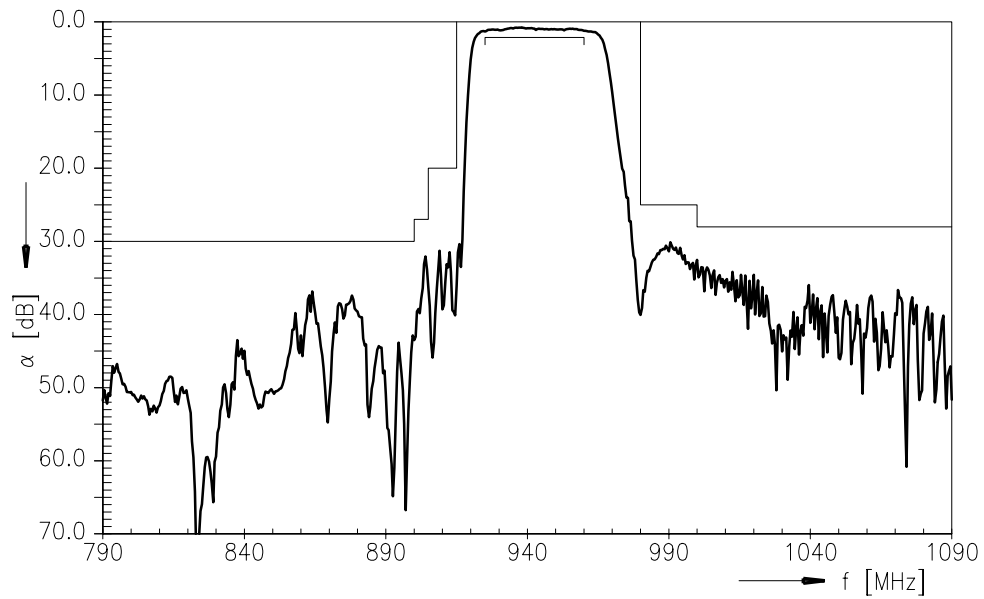
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	machine model, 10 pulses
Input Power at				
GSM 850, GSM 900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P _{IN}	15	dBm	
Tx bands				

¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

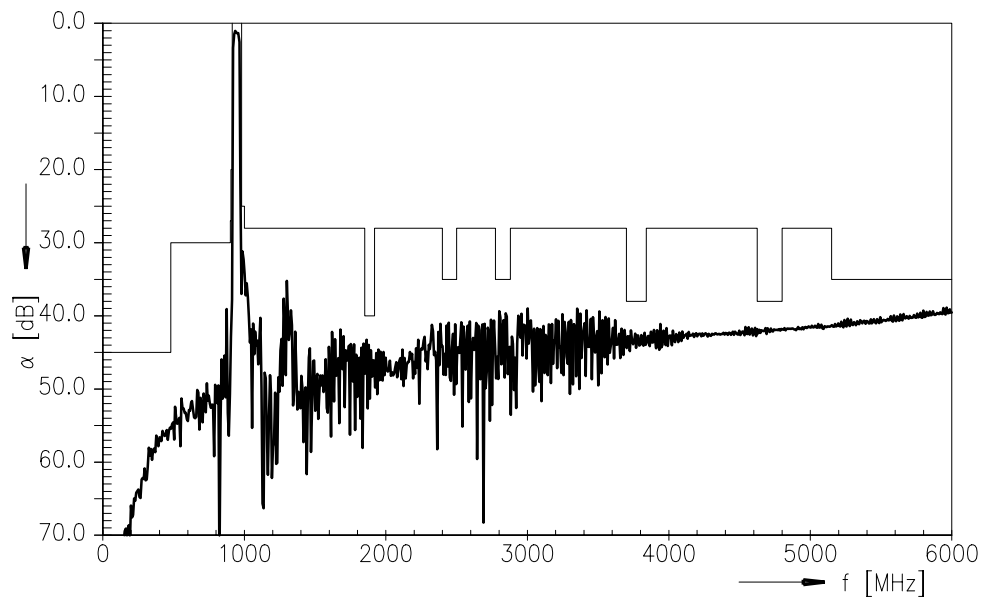
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Transfer function filter 1 (GSM900)



Transfer function filter 1 (GSM900) - wideband



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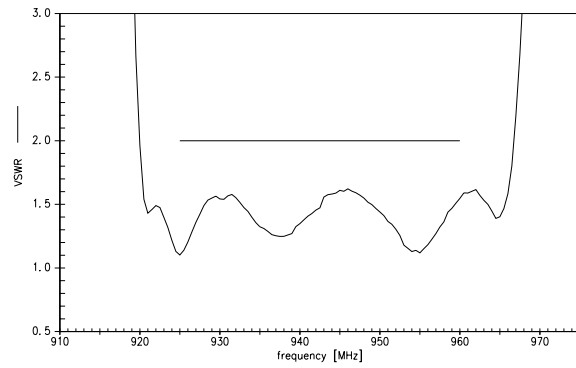
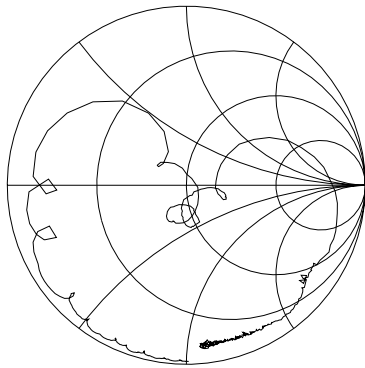


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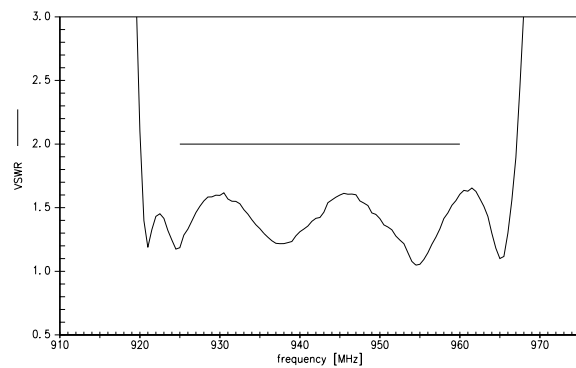
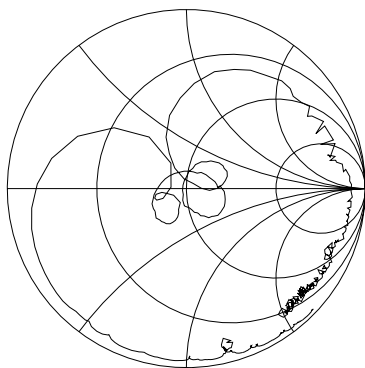


Smith charts filter 1 (GSM900)

S_{11} function



S_{22} function



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Data Sheet



Characteristics of Filter 2 (GSM850)

Temperature range for specification: $T = -20$ to $+75$ °C
 Terminating source impedance: $Z_S = 50$ Ω (unbalanced)
 Terminating load impedance: $Z_L = 150$ Ω (balanced) || 82nH

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	881.5	—	MHz
Maximum insertion attenuation	α_{max}				
869.0 ... 894.0 MHz		—	1.2	1.9	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
869.0 ... 894.0 MHz		—	0.4	1.1	dB
Input VSWR					
869.0 ... 894.0 MHz		—	1.6	2.0	
Output VSWR					
869.0 ... 894.0 MHz		—	1.5	2.0	
Output amplitude balance (S_{31}/S_{21})					
869.0 ... 894.0 MHz		-1.0	-0.5/0.2	1.0	dB
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)					
869.0 ... 894.0 MHz		-10	-2/3	10	°
Attenuation	α				
10.0 ... 447.0 MHz		45	55	—	dB
447.0 ... 849.0 MHz		30	35	—	dB
914.0 ... 954.0 MHz		25	29	—	dB
954.0 ... 1738.0 MHz		28	32	—	dB
1738.0 ... 1788.0 MHz		40	53	—	dB
1788.0 ... 3476.0 MHz		35	40	—	dB
3476.0 ... 6000.0 MHz		35	39	—	dB



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Maximum ratings of Filter 2

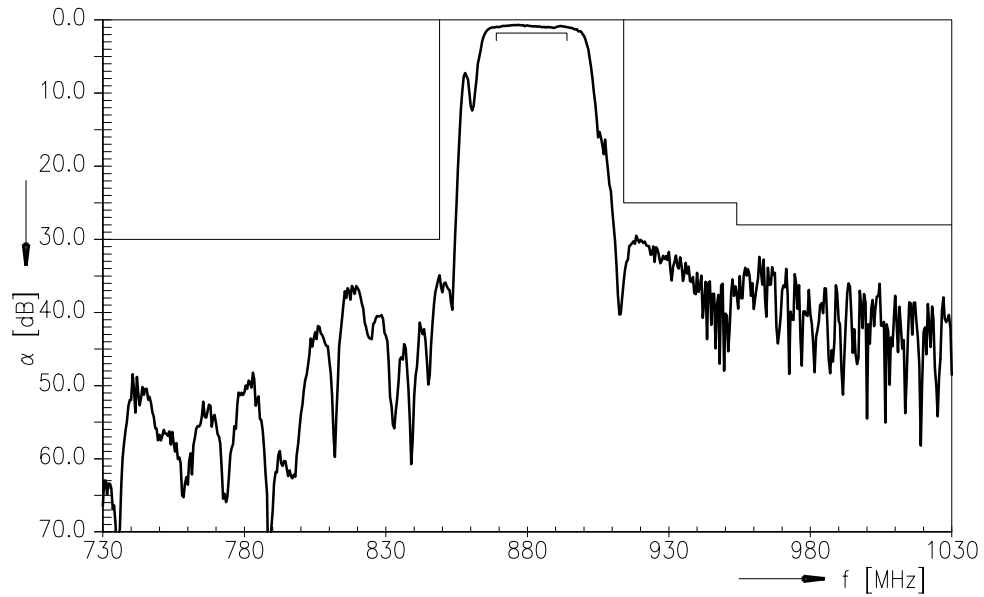
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	machine model, 10 pulses
Input Power at				
GSM 850, GSM 900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
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Tx bands				

¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

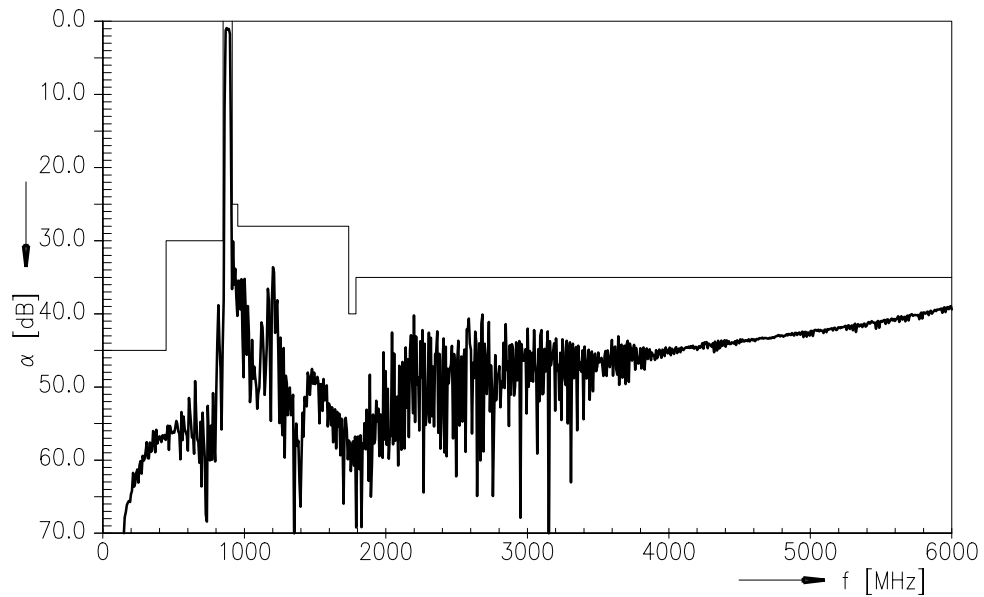
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Transfer function filter 2 (GSM850)



Transfer function filter 2 (GSM850) - wideband



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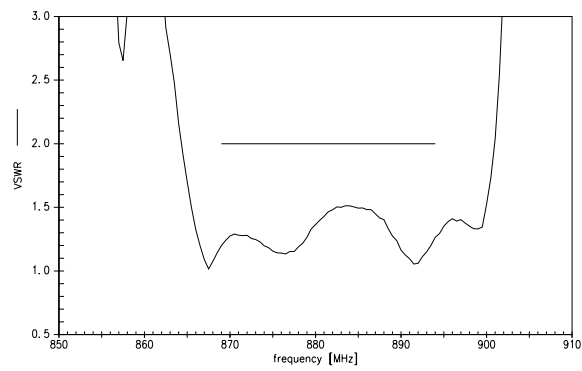
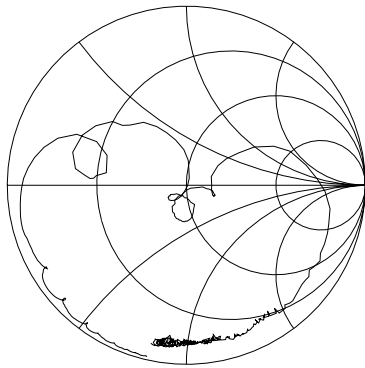


Data Sheet

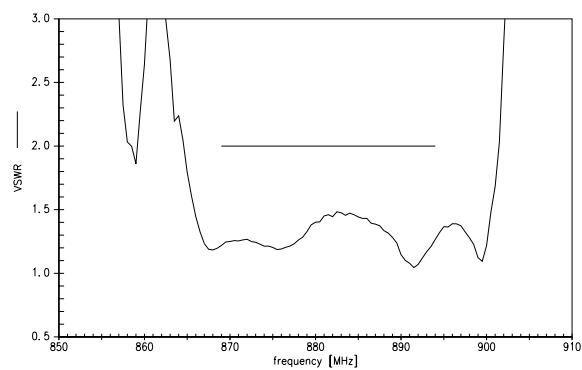
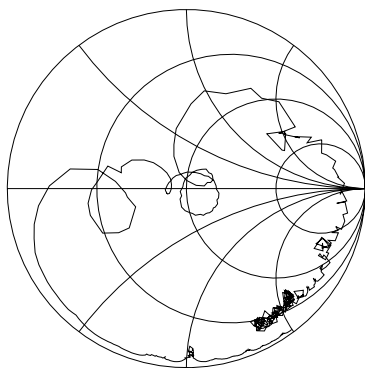


Smith charts filter 2 (GSM850)

S_{11} function



S_{22} function



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References

Type	B9721
Ordering code	B39901B9721F210
Marking and package	C61157-A8-A6
Packaging	F61074-V8222-Z000
Date codes	L_1126
S-parameters	B9721_LB_NB.s3p, B9721_LB_WB.s3p B9721_UB_NB.s3p, B9721_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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.

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12 October 16, 2007



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