



SAW Components

SAW Rx 2in1 filter

GSM 1800 / GSM 1900

Series/type:	B9303
Ordering code:	B39202B9303G110
Date:	August 22, 2006
Version:	2.0



Data sheet



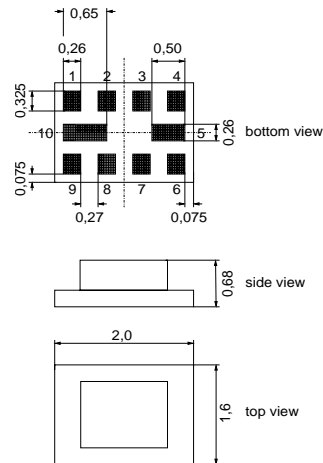
Application

- Low-loss 2in1 RF filter for mobile telephone GSM 1800 and GSM 1900 systems, receive path (Rx)
- Usable passband:
Filter 1 (GSM 1800): 75 MHz
Filter 2 (GSM 1900): 60 MHz
- Unbalanced to balanced operation for both filters
- Very low insertion attenuation
- Low amplitude ripple
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Suitable for GPRS class 1 to 12



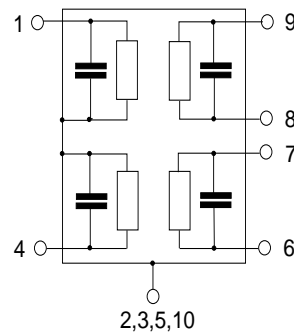
Features

- Package size 2.0 x 1.6 x 0.68 mm³
- Package code QCS10H
- RoHS compatible
- Approx. weight 0.008 g
- 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 (GSM 1800)

Temperature range for specification: $T = -20\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 150\ \Omega \parallel 15\text{ nH (balanced)}$

		min.	typ. @25°C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}	—	1.6 ¹⁾	2.3 ²⁾	dB
1805.0 ... 1880.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.7	1.3 ³⁾	dB
1805.0 ... 1880.0 MHz					
Input VSWR		—	1.8	2.2	
1805.0 ... 1880.0 MHz					
Output VSWR		—	1.7	2.2	
1805.0 ... 1880.0 MHz					
Output amplitude balance (S_{31}/S_{21})		-1.0	-0.5/0.7	1.0	dB
1805.0 ... 1880.0 MHz					
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)		-10	-3/+3	10	°
1805.0 ... 1880.0 MHz					
Attenuation	α				
10.0 ... 902.0 MHz		45	54	—	dB
902.0 ... 940.0 MHz		45	54	—	dB
940.0 ... 1705.0 MHz		28	36	—	dB
1705.0 ... 1785.0 MHz		12 ⁴⁾	18	—	dB
1920.0 ... 1980.0 MHz		17	23	—	dB
1980.0 ... 2030.0 MHz		25	30	—	dB
2030.0 ... 2400.0 MHz		28	35	—	dB
2400.0 ... 2500.0 MHz		32	37	—	dB
2500.0 ... 2775.0 MHz		28	31	—	dB
2775.0 ... 2880.0 MHz		38	43	—	dB
2880.0 ... 3610.0 MHz		28	41	—	dB
3610.0 ... 3760.0 MHz		38	41	—	dB
3760.0 ... 5415.0 MHz		28	40	—	dB
5415.0 ... 5640.0 MHz		35	39	—	dB
5640.0 ... 6000.0 MHz		28	39	—	dB

1) Typical value excluding PCB losses of 0.19 dB.
 2) 2.1 dB at 25 °C.
 3) 1.0 dB at 25 °C.
 4) 14 dB at 25 °C.

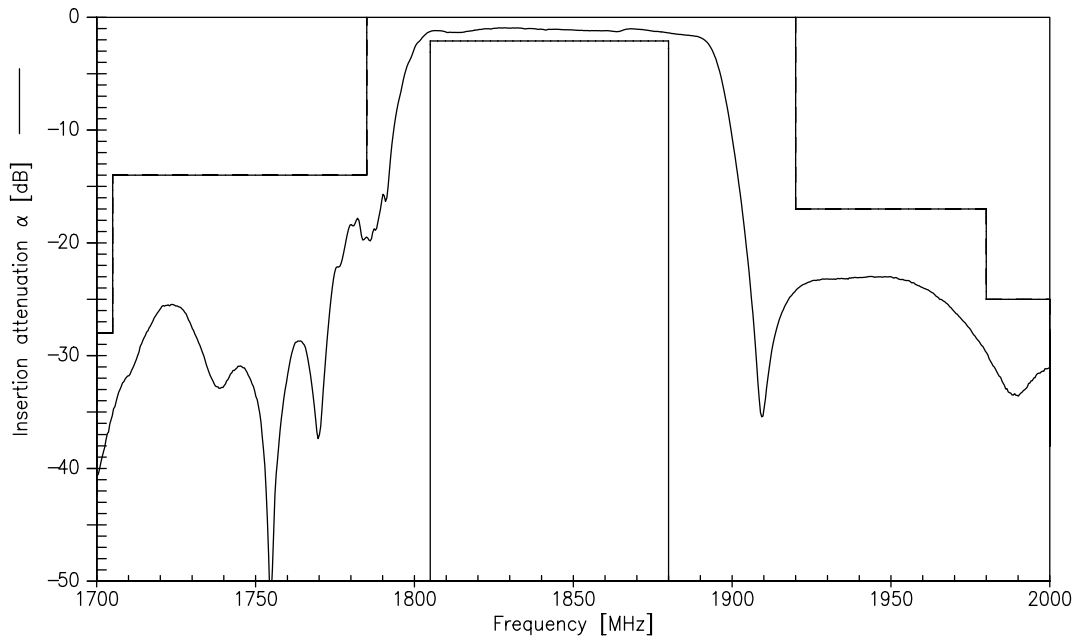
**Maximum ratings of Filter 1**

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}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P _{IN}	15	dBm	
Tx bands				

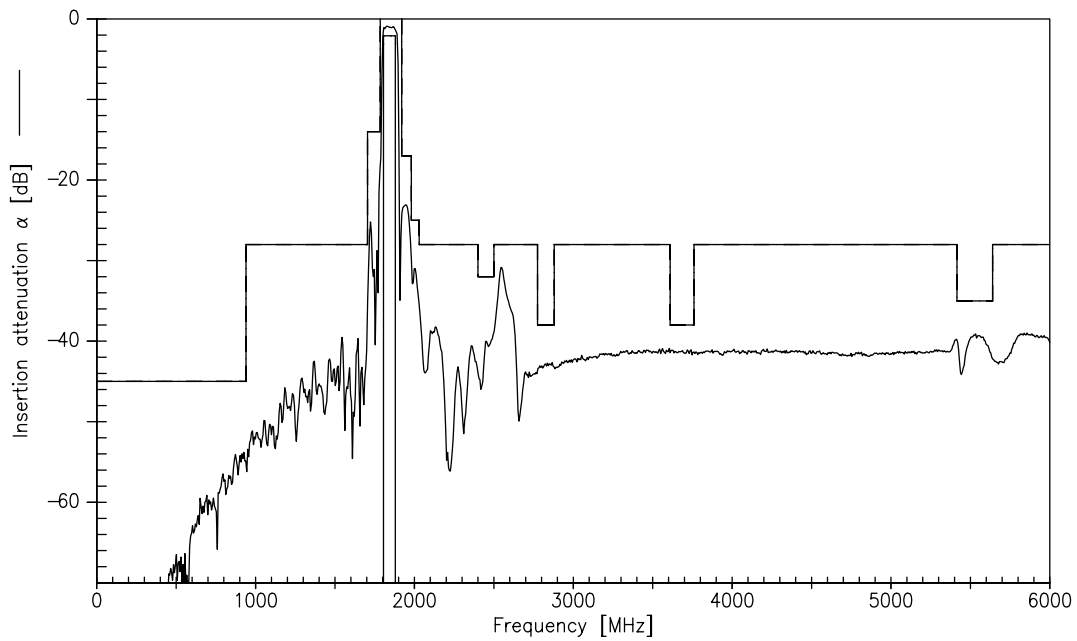
¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



Transfer function of Filter 1



Transfer function of Filter 1 (wideband)



Please read *cautions and warnings* and *important notes* at the end of this document.



Data sheet



Characteristics of Filter 2 (GSM 1900)

Temperature range for specification: T = -20 °C to +85 °C
 Terminating source impedance: Z_S = 50 Ω
 Terminating load impedance: Z_L = 150 Ω || 15 nH (balanced)

		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	1960.0	—	MHz
Maximum insertion attenuation	α _{max}	—	1.6 ¹⁾	2.3 ²⁾	dB
1930.0 ... 1990.0 MHz					
Amplitude ripple (p-p)	Δα	—	0.6	1.3 ³⁾	dB
1930.0 ... 1990.0 MHz					
Input VSWR		—	1.7	2.0	
1930.0 ... 1990.0 MHz					
Output VSWR		—	1.7	2.0	
1930.0 ... 1990.0 MHz					
Output amplitude balance (S₃₁/S₂₁)		-1.2	-0.7/0.7	1.2	dB
1930.0 ... 1990.0 MHz					
Output phase balance (φ(S₃₁) - φ(S₂₁)+180°)		-10	-5.0/3.0	10	°
1930.0 ... 1990.0 MHz					
Differential to common mode suppression	S _{sc12}	22	30	—	dB
1930.0 ... 1990.0 MHz					
Attenuation	α				
10.0 ... 1200.0 MHz		40	48	—	dB
1200.0 ... 1510.0 MHz		35	43	—	dB
1510.0 ... 1830.0 MHz		30	35	—	dB
1830.0 ... 1850.0 MHz		26	31	—	dB
1850.0 ... 1890.0 MHz		23	27	—	dB
1890.0 ... 1910.0 MHz		12 ⁴⁾	17	—	dB
2010.0 ... 2070.0 MHz		12 ⁵⁾	15	—	dB
2070.0 ... 2400.0 MHz		21	25	—	dB
2400.0 ... 2500.0 MHz		35	43	—	dB
2500.0 ... 3860.0 MHz		28	35	—	dB
3860.0 ... 3980.0 MHz		35	49	—	dB
3980.0 ... 5790.0 MHz		28	45	—	dB
5790.0 ... 6000.0 MHz		35	45	—	dB

1) Typical value excluding PCB losses of 0.20 dB
 2) 2.1 dB max at +25 °C
 3) 1.0 dB max at +25 °C
 4) 13 dB max at +25 °C
 5) 13 dB max at +25 °C



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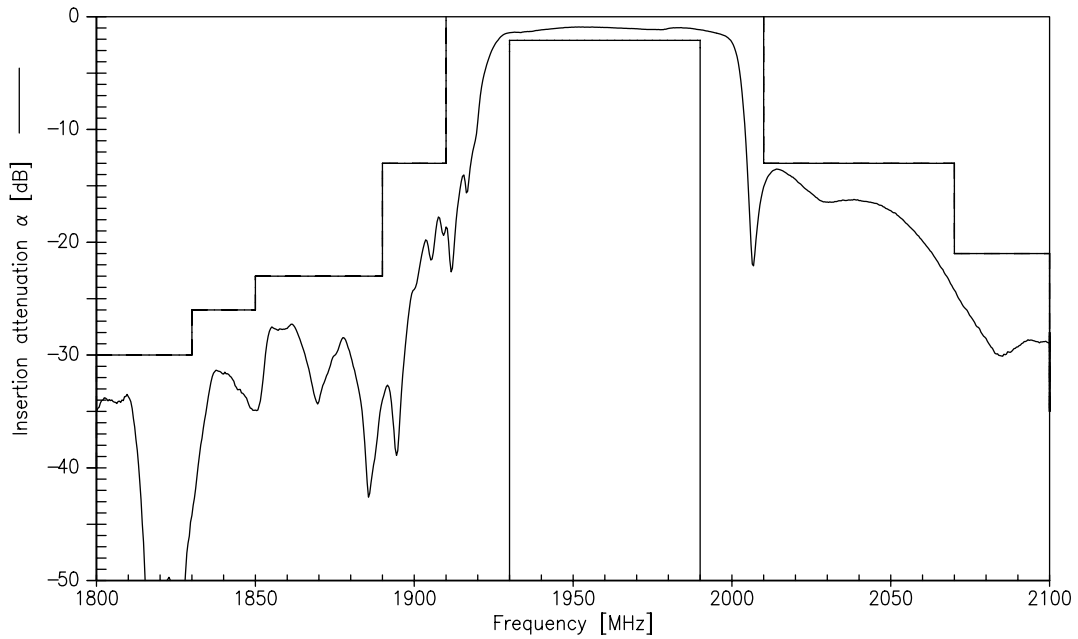
Maximum ratings of Filter 2

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}	50 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				

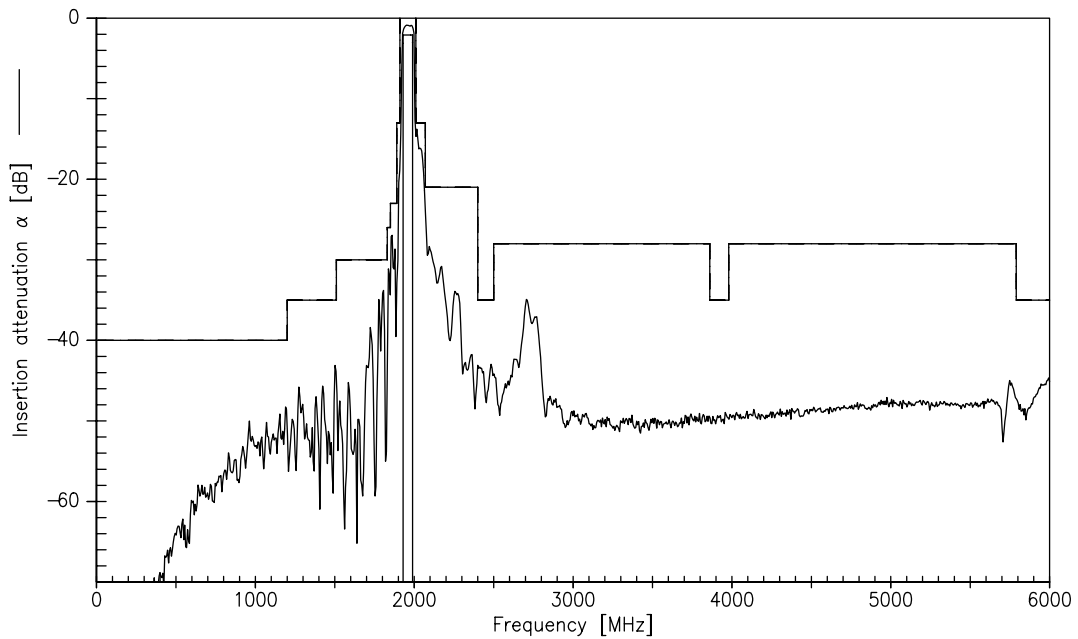
¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



Transfer function of Filter 2



Transfer function of Filter 2 (wideband)





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References

Type	B9303
Ordering code	B39202B9303G110
Marking and package	C61157-A7-A141
Packaging	F61074-V8152-Z000
Date code	L_1126
S-parameters	B9303_LB_NB.s3p B9303_LB_WB.s3p B9303_UB_NB.s3p B9303_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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