SAW Components

SAW Rx 2in1 filter

GSM 1800 / GSM 1900

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

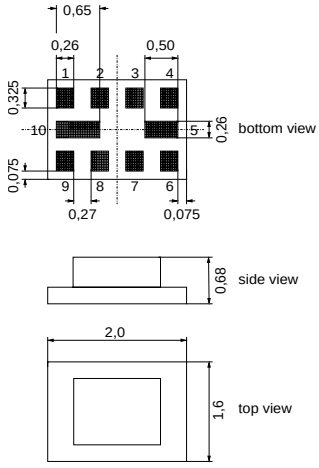
EPCOS

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 amplitute ripple
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Suitable for GPRS class 1 to 12

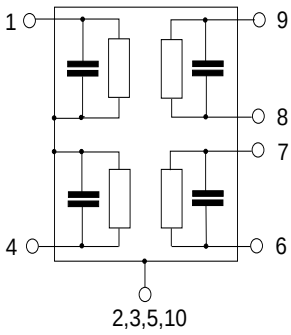
Features

- Package size 2.0 x1.6 x 0.68 mm^3
- Package code QCS10H
- RoHS compatible
- Approx. weight 0.008 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]
- 6,7 Output, balanced [Filter 2]
- 8,9 Output, balanced [Filter 1]
- 2,3,5,10 Case-ground



Characteristics of Filter 1 (GSM 1800)

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	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}				
1805.0 ... 1880.0 MHz		—	1.6[1)]	2.3[2)]	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1805.0 ... 1880.0 MHz		—	0.7	1.3[3)]	dB
Input VSWR					
1805.0 ... 1880.0 MHz		—	1.8	2.2	
Output VSWR					
1805.0 ... 1880.0 MHz		—	1.7	2.2	
Output amplitude balance ($\|S_{31}/S_{21}\|$)					
1805.0 ... 1880.0 MHz		–1.0	-0.5/0.7	1.0	dB
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)					
1805.0 ... 1880.0 MHz		–10	-3/+3	10	°
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

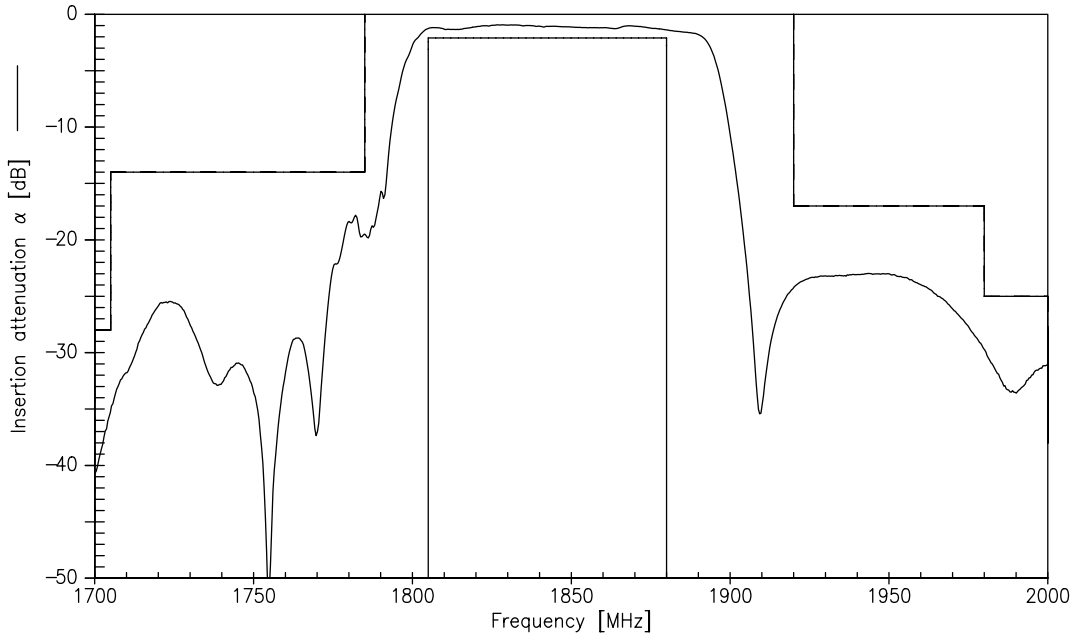
1) Typical value excluding PCB losses of 0.19 dB.
2) 2.1 dB at 25 ˚C.
3) 1.0 dB at 25 ˚C.
4) 14 dB at 25 ˚C.

Maximum ratings of Filter 1

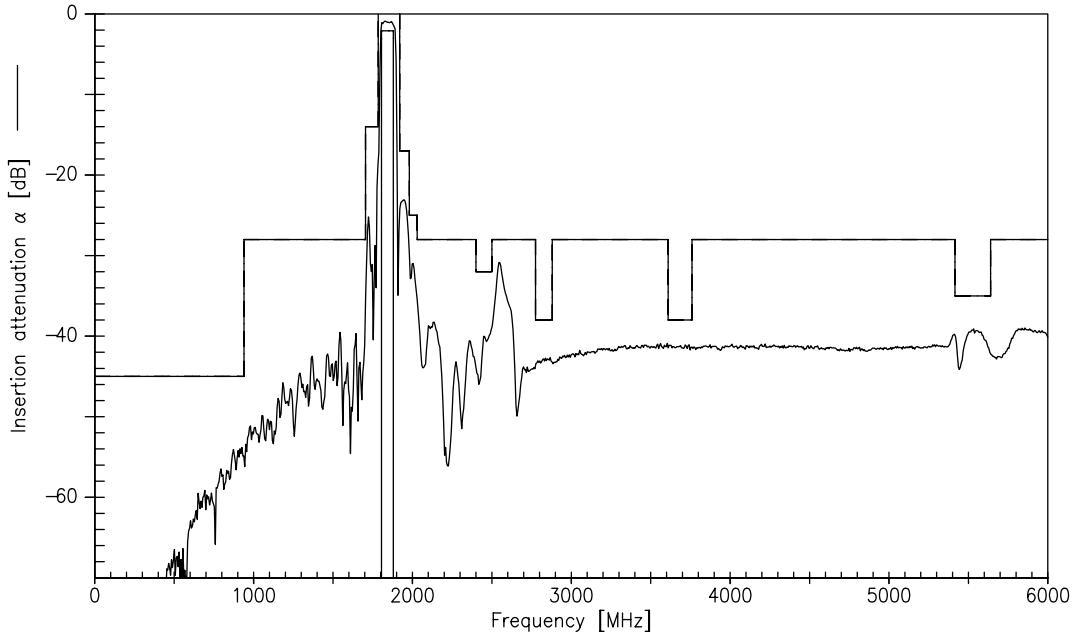
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function of Filter 1



Transfer function of Filter 1 (wideband)



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}				
1930.0 ... 1990.0 MHz		—	1.6[1)]	2.3[2)]	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1930.0 ... 1990.0 MHz		—	0.6	1.3[3)]	dB
Input VSWR					
1930.0 ... 1990.0 MHz		—	1.7	2.0	
Output VSWR					
1930.0 ... 1990.0 MHz		—	1.7	2.0	
Output amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
1930.0 ... 1990.0 MHz		–1.2	–0.7/0.7	1.2	dB
Output phase balance ($\phi(S_{31}) - \phi(S_{21})+180^\circ$)					
1930.0 ... 1990.0 MHz		–10	–5.0/3.0	10	°
Differential to common mode suppression	S_{sc12}				
1930.0 ... 1990.0 MHz		22	30	—	dB
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

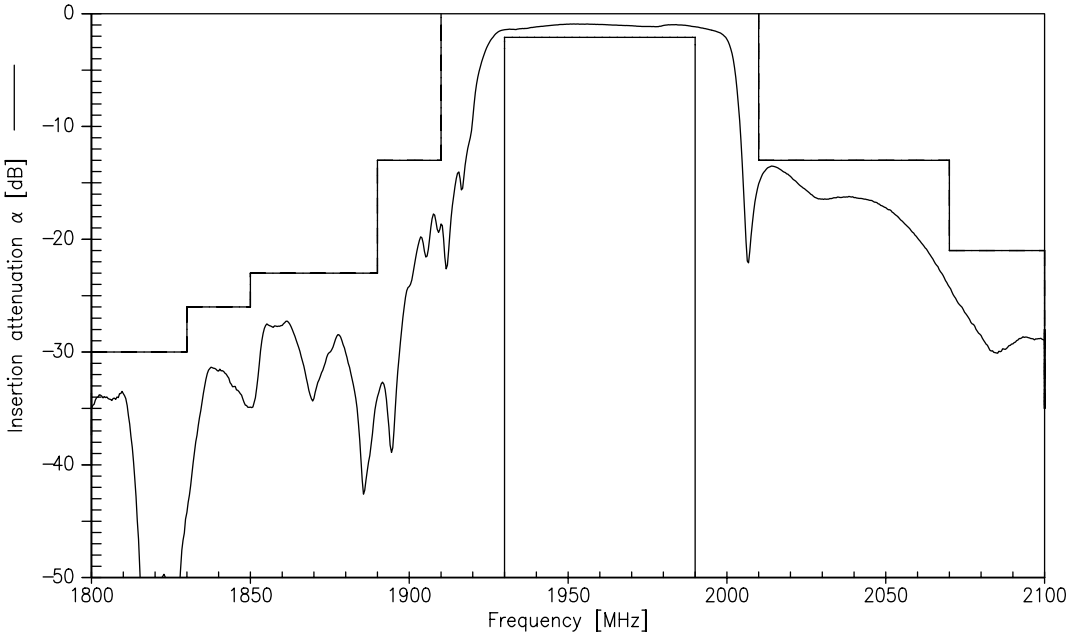
1) Typical value excluding PCB losses of 0.20 dB
2) 2.1 dB max at +25 ˚C
3) 1.0 dB max at +25 ˚C
4) 13 dB max at +25 ˚C
5) 13 dB max at +25 ˚C

Maximum ratings of Filter 2

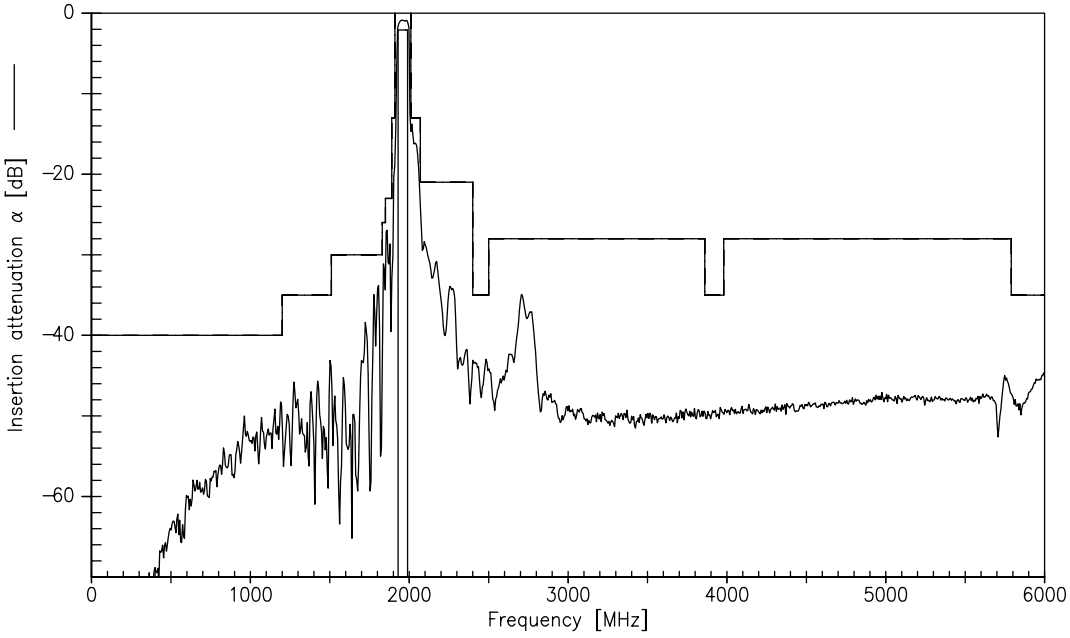
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function of Filter 2



Transfer function of Filter 2 (wideband)



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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