



SAW Components

SAW RF filter

Automotive telematics

Series/type:	B4235
Ordering code:	B39182B4235H910
Date:	February 25, 2011
Version:	2.2

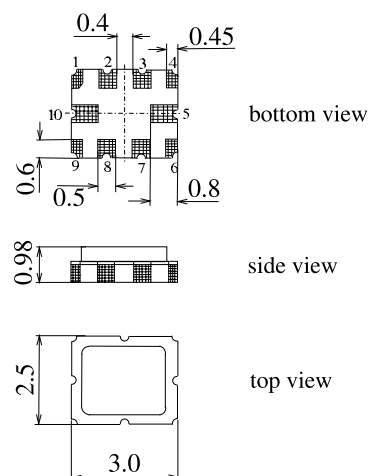
Application

- Low-loss RF filter for automotive telematics GSM 900/1800 system, receive path
- Usable passband:
Filter 1 (GSM900): 30MHz
Filter 2 (GSM1800): 75MHz
- Unbalanced to balanced operation of both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Suitable for GPRS class 1 to 12



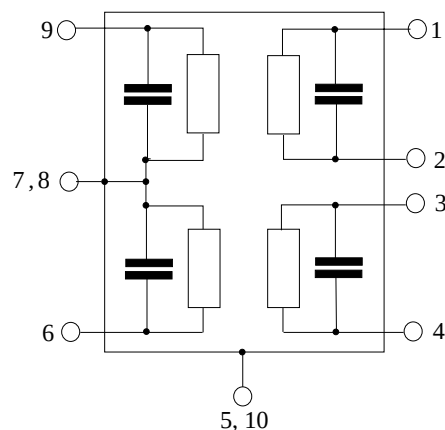
Features

- Package size 3.0 x 2.5 x 0.98 mm³
- Package code QCC10G
- RoHS compatible
- Approximate weight 0.027 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- Lead free soldering compatible with J - STD20C
- AEC-Q200 qualified component family
- **Electrostatic Sensitive Device (ESD)**



Pin configuration

- 1, 2 Output balanced [Filter 1]
- 3, 4 Output balanced [Filter 2]
- 6 Input [Filter 2]
- 9 Input [Filter 1]
- 5, 7, 8, 10 Ground (case)



Data sheet

Characteristics Filter 1 (GSM900)

Operating temperature range:

 $T = +25\text{ °C} \pm 2\text{ °C}$

Terminating source impedance:

 $Z_S = 50\ \Omega$ (unbalanced)

Terminating load impedance:

 $Z_L = 150\ \Omega$ (balanced) $\parallel 68\text{ nH}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	942.50	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$	—	1.8	2.2	dB
925.00 ... 960.00 MHz		—	1.8	2.2	
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.6	1.2	dB
925.00 ... 960.00 MHz		—	0.6	1.2	
Input VSWR		—	1.9	2.1	
925.00 ... 960.00 MHz		—	1.9	2.1	
Output VSWR		—	1.9	2.1	
925.00 ... 960.00 MHz		—	1.9	2.1	
Output amplitude balance ($ S_{31}/S_{21} $)		-2.0		2.0	dB
925.00 ... 960.00 MHz		-2.0		2.0	
Output phase balance ($\phi(S_{31}) - \phi(S_{21}) + 180^\circ$)		-10.0		10.0	degree
925.00 ... 960.00 MHz		-10.0		10.0	
Attenuation	α				
10.00 ... 480.00 MHz		45	53	—	dB
480.00 ... 880.00 MHz		30	38	—	dB
880.00 ... 905.00 MHz		24	27	—	dB
905.00 ... 915.00 MHz		20	25	—	dB
980.00 ... 1050.00 MHz		23	30	—	dB
1050.00 ... 3500.00 MHz		30	34	—	dB
3500.00 ... 4500.00 MHz		22	26	—	dB
4500.00 ... 6000.00 MHz		15	17	—	dB

Data sheet

Characteristics Filter 1 (GSM900)

Temperature range for specification:

 $T = -20\text{ °C to }+75\text{ °C}$

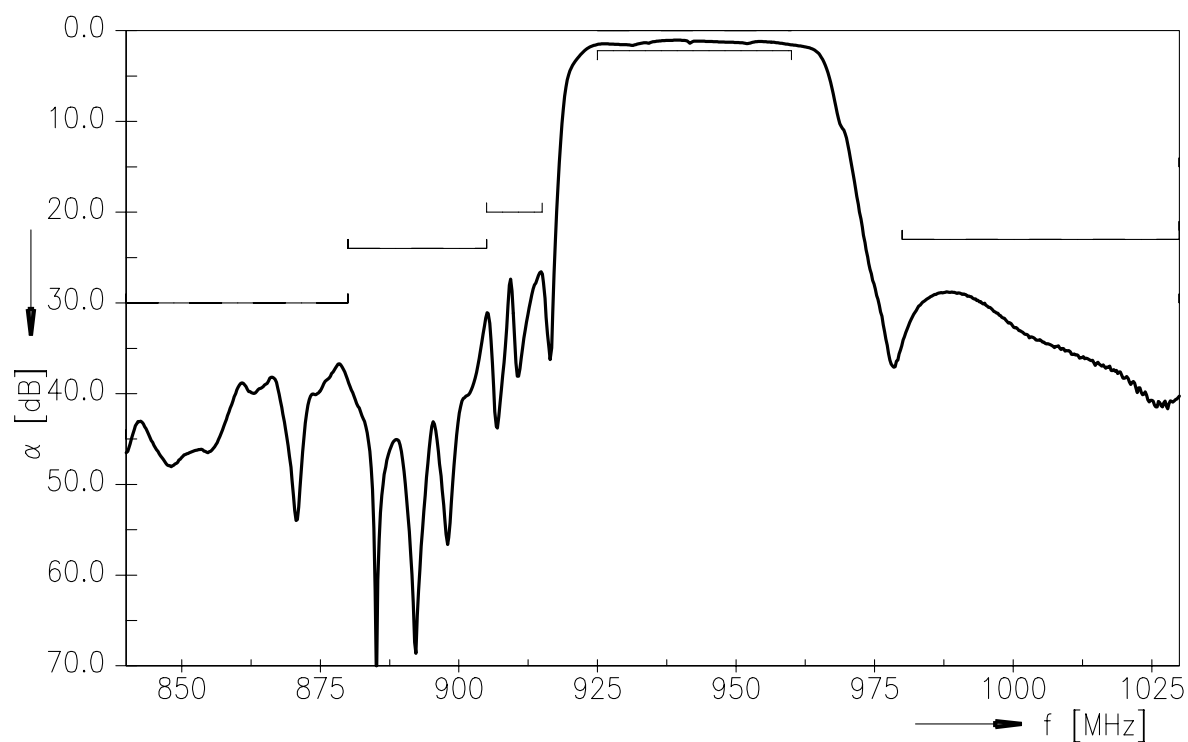
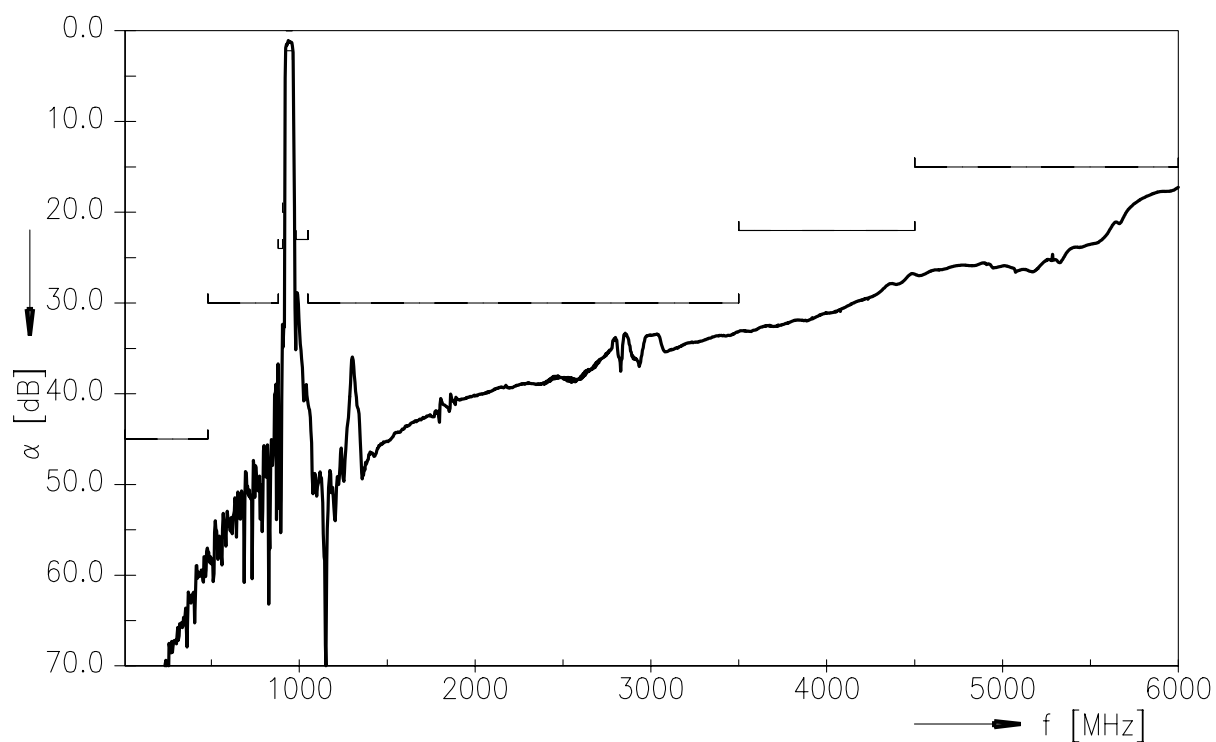
Terminating source impedance:

 $Z_S = 50\ \Omega$ (unbalanced)

Terminating load impedance:

 $Z_L = 150\ \Omega$ (balanced) $\parallel 68\text{ nH}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	942.50	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$	—	1.8	2.5	dB
925.00 ... 960.00 MHz		—	1.8	2.5	
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.9	1.5	dB
925.00 ... 960.00 MHz		—	0.9	1.5	
Input VSWR		—	1.9	2.1	
925.00 ... 960.00 MHz		—	1.9	2.1	
Output VSWR		—	1.9	2.1	
925.00 ... 960.00 MHz		—	1.9	2.1	
Output amplitude balance ($ S_{31}/S_{21} $)		-2.5		2.5	dB
925.00 ... 960.00 MHz		-2.5		2.5	
Output phase balance ($\phi(S_{31}) - \phi(S_{21}) + 180^\circ$)		-12.0		12.0	degree
925.00 ... 960.00 MHz		-12.0		12.0	
Attenuation	α				
10.00 ... 480.00 MHz		45	50	—	dB
480.00 ... 880.00 MHz		30	38	—	dB
880.00 ... 905.00 MHz		24	27	—	dB
905.00 ... 915.00 MHz		11	18	—	dB
980.00 ... 1050.00 MHz		23	30	—	dB
1050.00 ... 3500.00 MHz		30	34	—	dB
3500.00 ... 4500.00 MHz		22	26	—	dB
4500.00 ... 6000.00 MHz		15	17	—	dB

Transfer function of filter 1(narrow band)

Transfer function of filter 1 (wide band)


Characteristics Filter 2 (GSM1800)

Operating temperature range: $T = +25\text{ °C} \pm 2\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$ (unbalanced)
 Terminating load impedance: $Z_L = 150\ \Omega$ (balanced) $\parallel 12\text{ nH}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1842.50	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$	—	2.4	2.7	dB
1805.00 ... 1880.00 MHz		—			
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.2	1.5	dB
1805.00 ... 1880.00 MHz		—			
Input VSWR		—	2.4	2.6	
1805.00 ... 1880.00 MHz		—			
Output VSWR		—	2.2	2.4	
1805.00 ... 1880.00 MHz		—			
Output amplitude balance ($ S_{31}/S_{21} $)		-1.5		1.5	dB
1805.00 ... 1880.00 MHz					
Output phase balance ($\phi(S_{31}) - \phi(S_{21}) + 180^\circ$)		-10.0		10.0	degree
1805.00 ... 1880.00 MHz					
Attenuation	α				
10.00 ... 1000.00 MHz		40	50	—	dB
1000.00 ... 1705.00 MHz		26	28	—	dB
1705.00 ... 1785.00 MHz		13	17	—	dB
1920.00 ... 1980.00 MHz		15	24	—	dB
1980.00 ... 2030.00 MHz		24	28	—	dB
2030.00 ... 5000.00 MHz		30	34	—	dB
5000.00 ... 6000.00 MHz		25	34	—	dB

Characteristics Filter 2 (GSM1800)

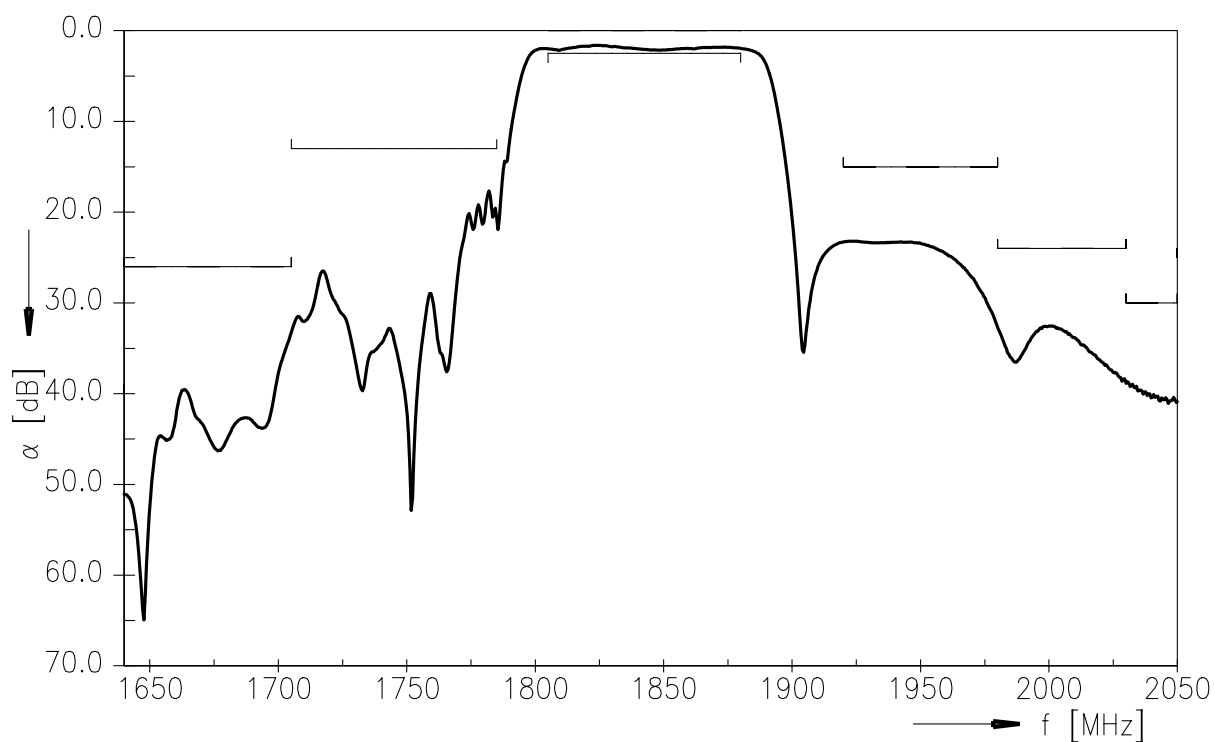
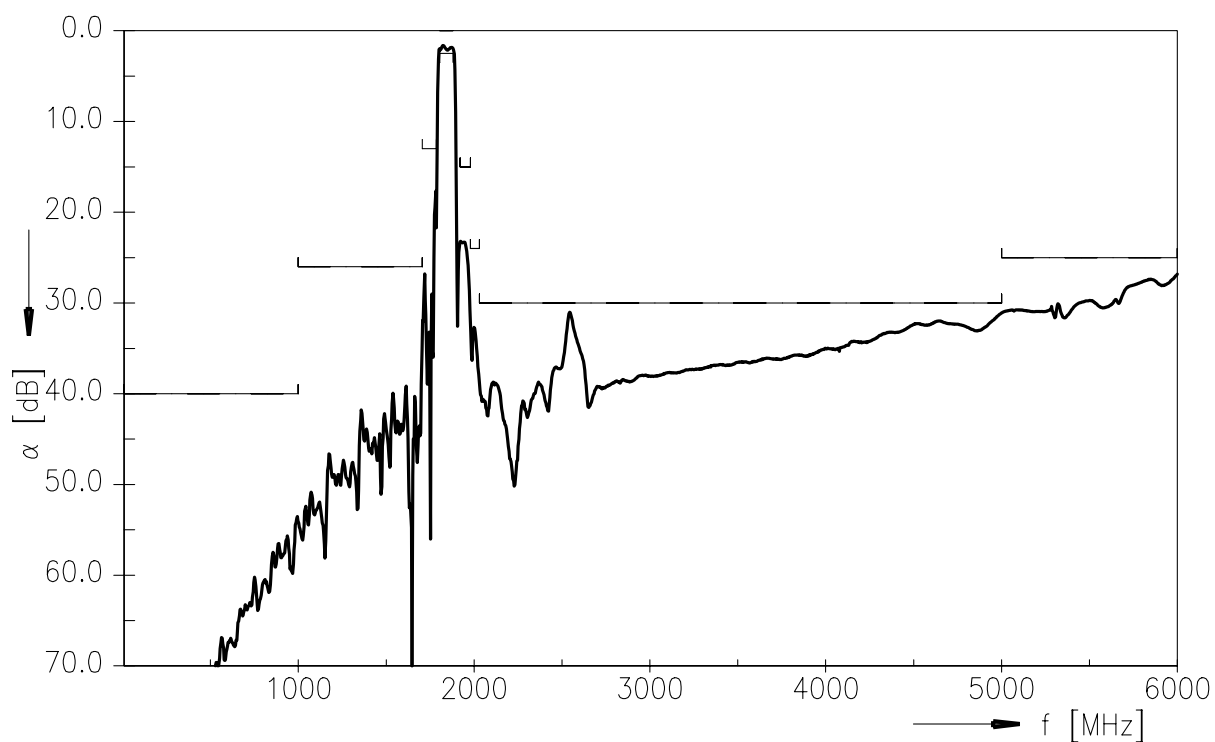
Temperature range for specification: $T = -20\text{ °C to }+75\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$ (unbalanced)
 Terminating load impedance: $Z_L = 150\ \Omega$ (balanced) $\parallel 12\text{ nH}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1842.50	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$	—	2.4	2.7	dB
1805.00 ... 1880.00 MHz		—	2.4	2.7	dB
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.5	1.8	dB
1805.00 ... 1880.00 MHz		—	1.5	1.8	dB
Input VSWR		—	2.4	2.6	
1805.00 ... 1880.00 MHz		—	2.4	2.6	
Output VSWR		—	2.2	2.4	
1805.00 ... 1880.00 MHz		—	2.2	2.4	
Output amplitude balance ($ S_{31}/S_{21} $)		-1.5		1.5	dB
1805.00 ... 1880.00 MHz		-1.5		1.5	dB
Output phase balance ($\phi(S_{31}) - \phi(S_{21}) + 180^\circ$)		-10.0		10.0	degree
1805.00 ... 1880.00 MHz		-10.0		10.0	degree
Attenuation	α				
10.00 ... 1000.00 MHz		40	50	—	dB
1000.00 ... 1705.00 MHz		26	28	—	dB
1705.00 ... 1785.00 MHz		10	17	—	dB
1920.00 ... 1980.00 MHz		15	24	—	dB
1980.00 ... 2030.00 MHz		24	28	—	dB
2030.00 ... 5000.00 MHz		30	34	—	dB
5000.00 ... 6000.00 MHz		25	34	—	dB

Maximum ratings

Operable temperature range	T	−45/+125	°C	
Storage temperature range	T _{stg}	−45/+125	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD} ¹⁾	50	V	Machine Model, 10 pulses
Input power at Tx band: GSM850, GSM900				peak power of GSM signal
GSM1800, GSM1900	P _{IN}	15	dBm	duty cycle 4:8

¹⁾ -acc. to JESD22-A115A (Machine Model), 10 negative & 10 positive pulses

Transfer function of filter 1(narrow band)

Transfer function of filter 1 (wide band)


References

Type	B4235
Ordering code	B39182B4235H910
Marking and package	C61157-A7-A142
Packaging	F61074-V8174-Z000
Date codes	L_1126
S-parameters	B4235_NB.s2p B4235_WB.s2p 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."
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm

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