



SAW Components

SAW Tx filter

Automotive telematics

Series/type:	B4315
Ordering code:	B39192B4315P810
Date:	August 14, 2012
Version:	2.1

Data sheet



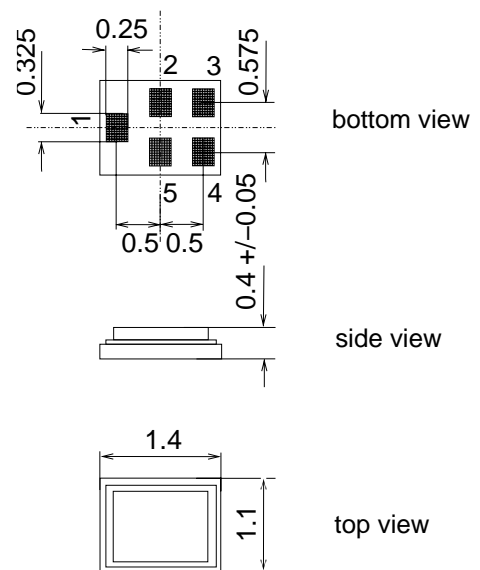
Application

- Low-loss RF filter for mobile telephone PCS, transmit path (TX)
- No matching network required for operation at 50 Ω
- Usable passband 58.75 MHz



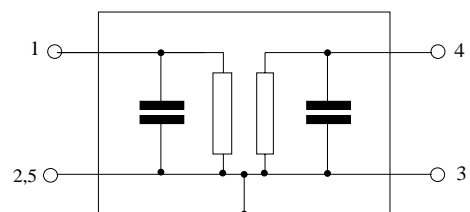
Features

- Package size 1.4 x1.1 x 0.4 mm³
- Package code QCS5M
- RoHS compatible
- Approximate weight 0.003 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- AEC-Q200 qualified component family (operable temperature range -40°C to +85°C)
- **Electrostatic Sensitive Device (ESD)**



Pin configuration

- 1 Input
- 4 Output
- 2,3,5 To be grounded



Data sheet


Characteristics

Temperature range for specification: $T = -30\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega \parallel 20\text{nH}$
 Terminating load impedance: $Z_L = 50\ \Omega \parallel 10\text{nH}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1880.0	—	MHz
Maximum insertion attenuation	α_{\max}				
1850.625 ... 1909.375 MHz		—	2.6	4.5	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1850.625 ... 1909.375 MHz		—	1.5	3.3	dB
VSWR					
Input	1850.625 ... 1909.375 MHz	—	1.5	2.5	
Output	1850.625 ... 1909.375 MHz	—	1.6	2.6	
Attenuation	α				
10.0 ... 1550.0 MHz		32	39	—	dB
1550.0 ... 1580.0 MHz		35	40	—	dB
1580.0 ... 1770.0 MHz		30	38	—	dB
1770.0 ... 1830.0 MHz		14	26	—	dB
1930.625... 1990.0 MHz		20	32	—	dB
1990.0 ... 2032.0 MHz		35	40	—	dB
2032.0 ... 2500.0 MHz		33	38	—	dB
2500.0 ... 3700.0 MHz		30	37	—	dB
3700.0 ... 3820.0 MHz		35	50	—	dB
3820.0 ... 6000.0 MHz		24	40	—	dB

Maximum ratings

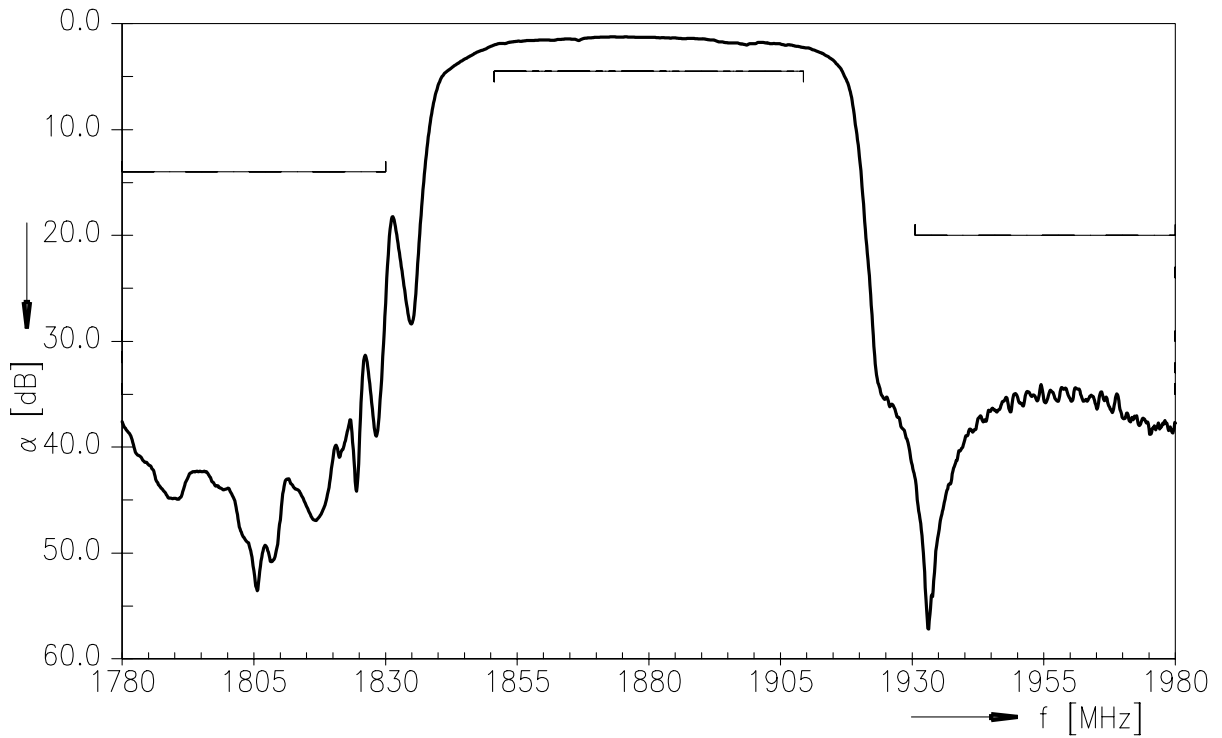
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	0	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	machine model, 10 pulses
Input power at				
GSM850, GSM900	P _{IN}	15	dBm	effective power in the on-state, duty cycle 4:8
GSM1800, GSM1900	P _{IN}	15	dBm	
Tx bands				

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

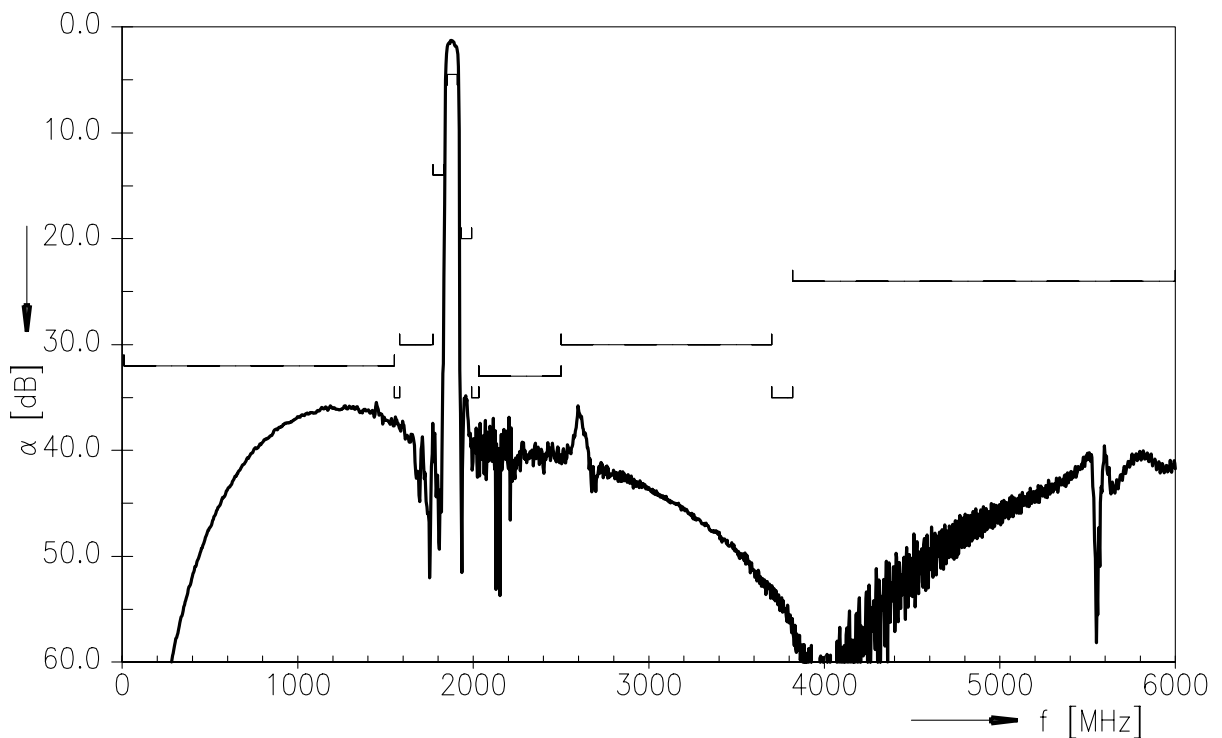
Data sheet



Frequency response (narrowband)



Frequency response (wideband)



ESD protection of SAW filters

SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

In general, “ESD matching” has to be ensured at that filter port, where electrostatic discharge is expected.

Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

Below three figures show recommended “ESD matching” topologies.

For wideband filters the high-pass ESD matching structure needs to be at least of 3rd order to ensure a proper matching for any impedance value of antenna and SAW filter input. The required component values have to be determined from case to case.

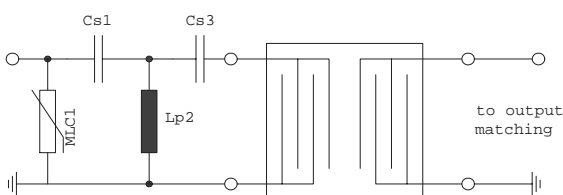


Fig. 1 MLC varistor plus ESD matching

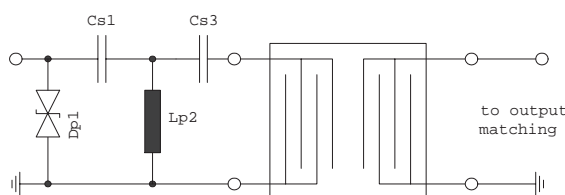


Fig. 2 Suppressor diode plus ESD matching

In cases where minor ESD occur, following simplified “ESD matching” topologies can be used alternatively.

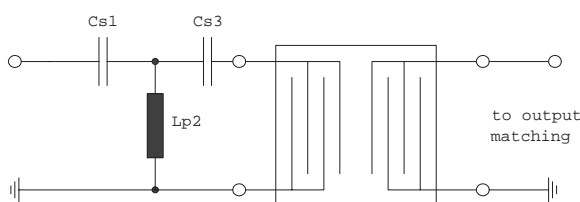


Fig. 3 3rd order high-pass structure for basic ESD protection

In all three figures the shunt inductor Lp2 could be replaced by a shorted microstrip with proper length and width. If this configuration is possible depends on the operating frequency and available pcb space.

Effectiveness of the applied ESD protection has to be checked according to relevant industry standards or customer specific requirements

For further information, please refer to EPCOS Application report:

“ESD protection for SAW filters”.

This report can be found under www.epcos.com/rke. Click on “Applications Notes”.

References

Type	B4315
Ordering code	B39192B4315P810
Marking and package	C61157-A8-A8
Packaging	F61074-V8212-Z000
Date codes	L_1126
S-parameters	B4315_NB.s2p, B4315_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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
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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