



RF360
Europe GmbH

SAW Components

SAW Rx filter

Automotive Telematics

Series/type:	B4321
Ordering code:	B39811B4321P810
Date:	December 11, 2013
Version:	2.1

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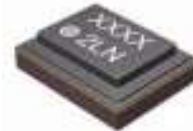
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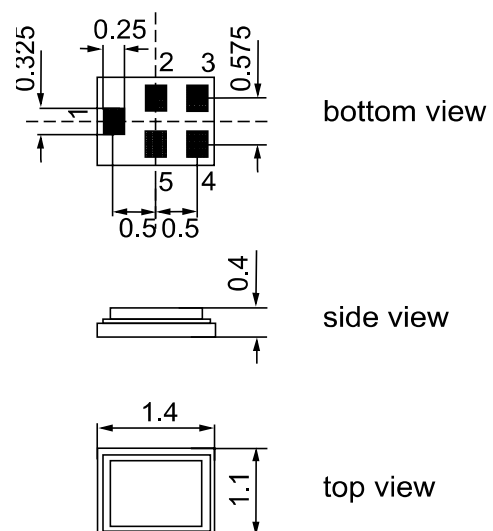
Data sheet


Application

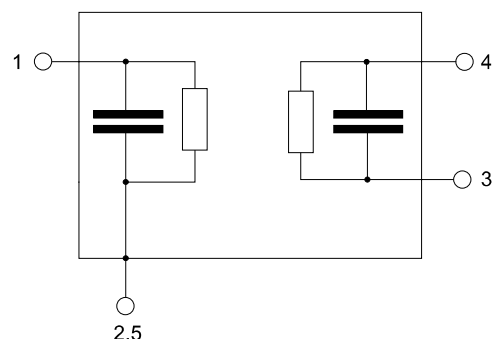
- Low-loss RF filter for LTE systems (Rx)
- Impedance transformation from 50 Ω to 100 Ω
- Unbalanced to balanced operation
- Usable passband 29.5 MHz


Features

- Package size 1.4 x 1.1 x 0.4 mm³
- Package code QCS5P
- 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
- 3,4 Output, balanced
- 2,5 To be grounded



Data sheet

Characteristics

Temperature range for specification: $T = -20\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 100\ \Omega \parallel 56\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	806.00	—	MHz
Maximum insertion attenuation	α_{\max}				
	791.25 ... 820.75 MHz	—	2.8	4.2	dB
@ f_{Carrier}	793.50 ... 818.50 MHz $\alpha_{\text{LTE}}^{1)}$	—	2.0	3.1	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
	791.25 ... 820.75 MHz	—	1.5	2.7	dB
@ f_{Carrier}	793.50 ... 818.50 MHz $\alpha_{\text{LTE}}^{1)}$	—	0.8	1.6	dB
VSWR					
	791.25 ... 820.75 MHz	—	1.9	2.3	
Common mode rejection ratio					
	791.25 ... 820.75 MHz	20	30	—	dB
Attenuation	α				
	50.00 ... 770.00 MHz	45	55	—	dB
	832.25 ... 838.00 MHz	35	42	—	dB
	838.00 ... 861.75 MHz	38	42	—	dB
	862.00 ... 4000.00 MHz	40	54	—	dB
	4000.00 ... 6000.00 MHz	40	60	—	dB

1) Mean value in any 5MHz channel.

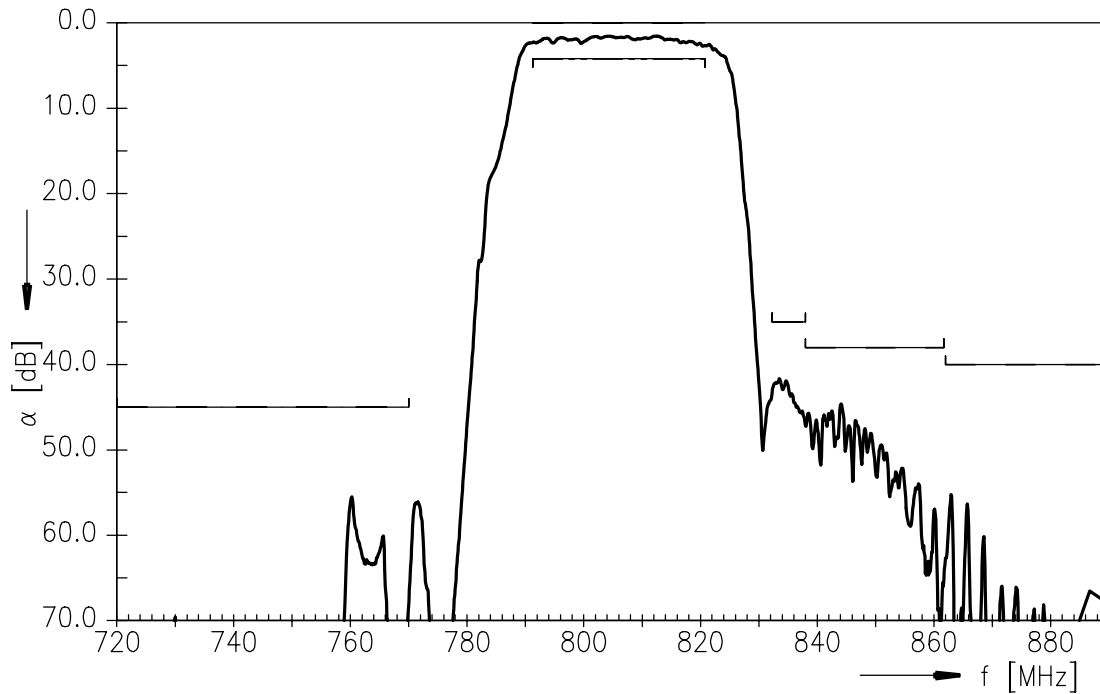

Maximum ratings

Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	0	V	
Input power at				
791.25 ... 820.75 MHz	P _{IN}	10	dBm	effective power in the on-state, duty cycle 1:10
824.00 ... 924.00 MHz	P _{IN}	20	dBm	peak power of GSM signal, duty cycle 4:8
1710.0 ... 1990.0 MHz	P _{IN}	20	dBm	peak power of GSM signal, duty cycle 4:8

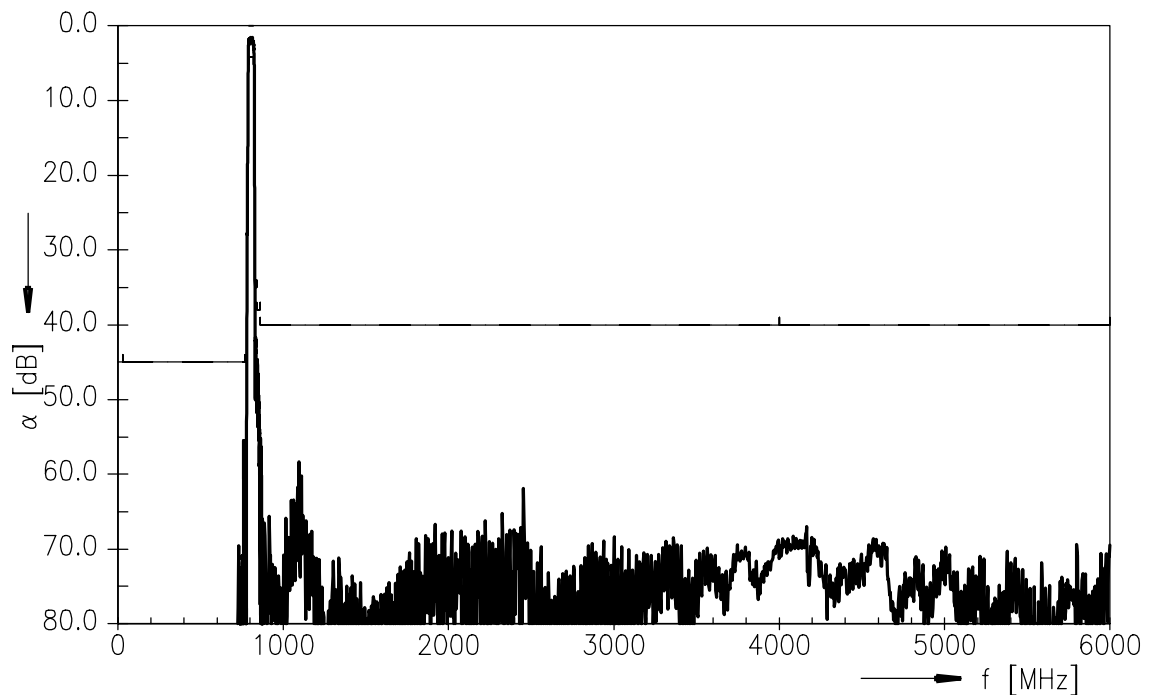
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Frequency response (narrowband)



Frequency response (wideband)

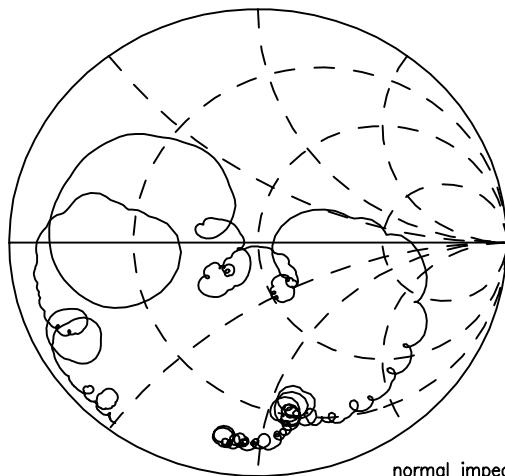


Data sheet

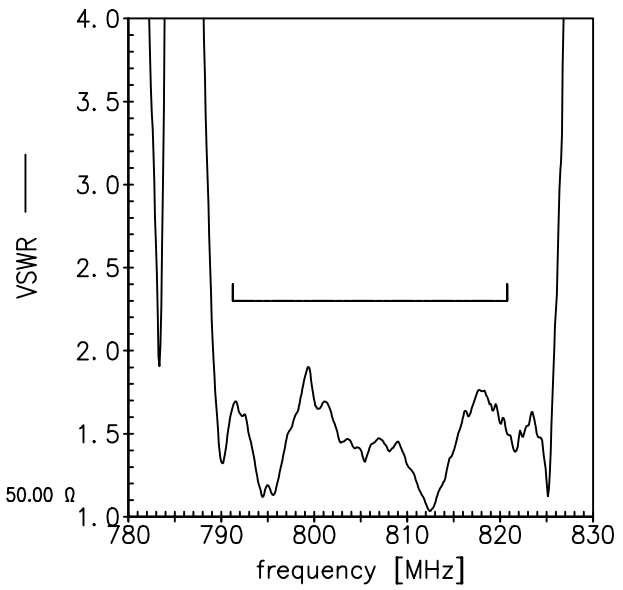


Smith chart

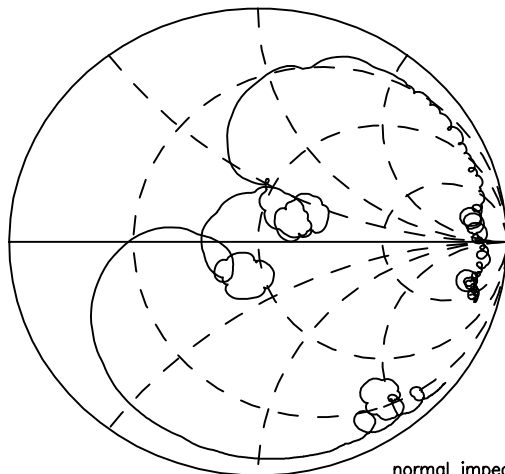
S₁₁ function



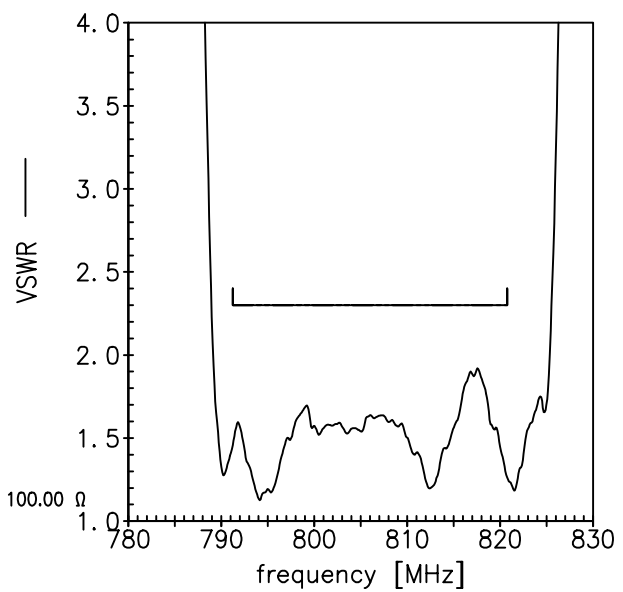
normal impedance: 50.00 Ω



S₂₂ function



normal impedance: 100.00 Ω



Data sheet


ESD protection of SAW filters

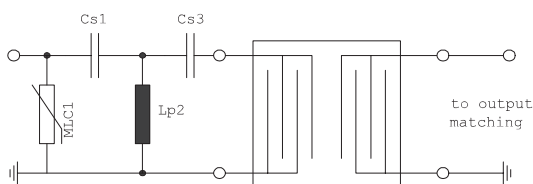
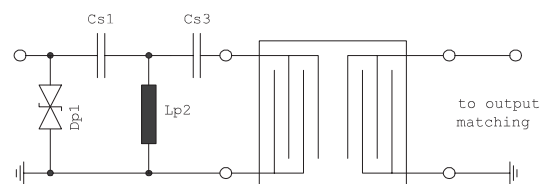
SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

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

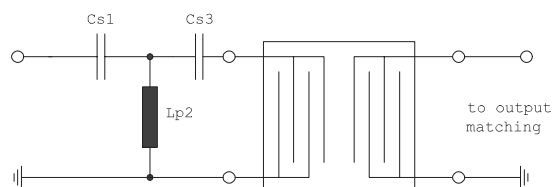
Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

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”.

SAW Components	B4321
SAW Rx filter	806.00 MHz

Data sheet



References

Type	B4321
Ordering code	B39811B4321P810
Marking and package	C61157-A8-A9
Packaging	F61074-V8212-Z000
Date codes	L_1126
S-parameters	B4321_NB_UN.s3p, B4321_WB_UN.s3p see file header for port/pin assignment table
Soldering profile	S_6001
RoHS compatible	RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8 th , 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.
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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 for a large variety of matching coils.

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