



SAW Components

SAW filter

Short range devices

Series/type:	B4316
Ordering code:	B39871B4316P810
Date:	March 02, 2012
Version:	2.0

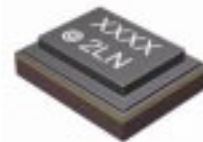
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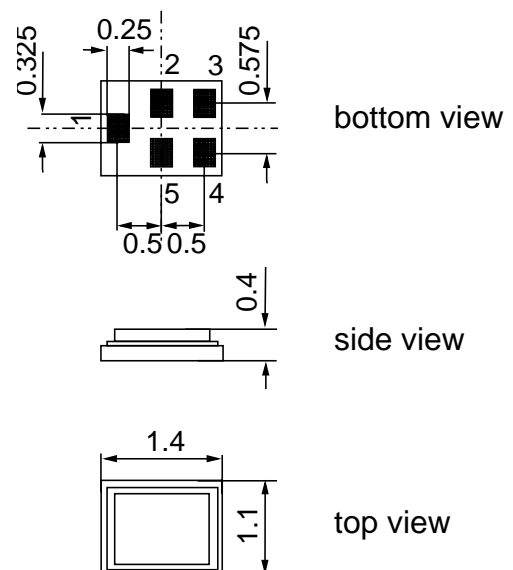
Data sheet


Application

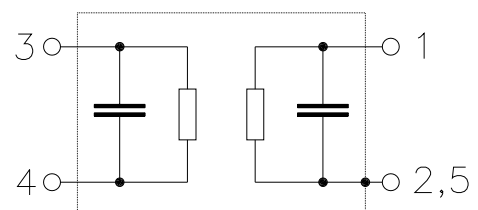
- Low-loss RF filter for remote control receivers.
- No matching network required for operation at 50 Ω .
- Unbalanced to unbalanced operation.
- Usable passband 2MHz.


Features

- Package size 1.4 x1.1 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 unbalanced
- 4 Output unbalanced
- 2,3,5 To be grounded



Data sheet


Characteristics

Temperature range for specification: $T = -40\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 50\ \Omega$

				min.	typ. @ 25 °C	max.	
Center frequency			f_C	—	869.0	—	MHz
Maximum insertion attenuation	868.0 ... 870.0		α_{\max}	—	2.0	2.9	dB
Amplitude ripple (p-p)	868.0 ... 870.0		$\Delta\alpha$	—	0.5	1.2	dB
VSWR	868.0 ... 870.0			—	1.4	2.0	
Attenuation			α				
	10.0 ... 845.0			39	46	—	dB
	845.0 ... 851.0			42	47	—	dB
	851.0 ... 856.8			13	27	—	dB
	883.0 ... 892.0			24	36	—	dB
	892.0 ... 910.0			48	60	—	dB
	910.0 ... 1000.0			40	50	—	dB


Maximum ratings

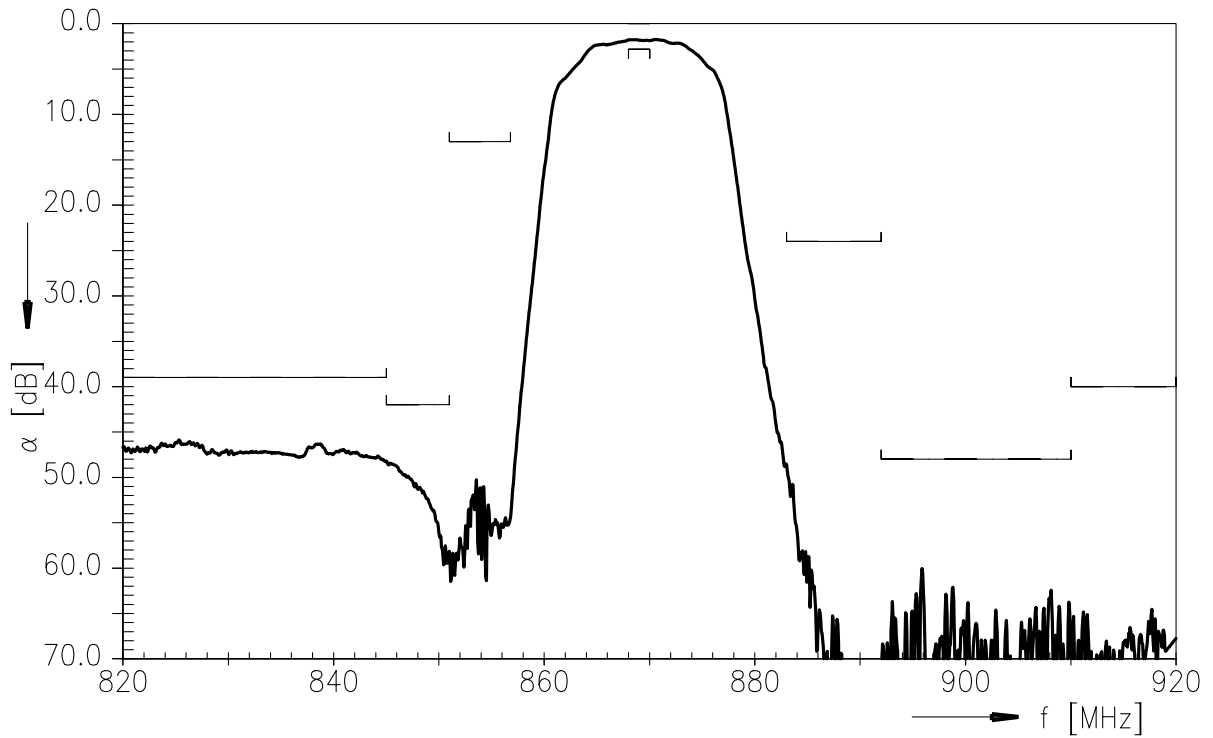
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	0	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	machine model, 10 pulses
Input power	P _{IN}	13	dBm	cw signal
868.00 ... 870.00 MHz		15	dBm	duty cycle 1:10

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

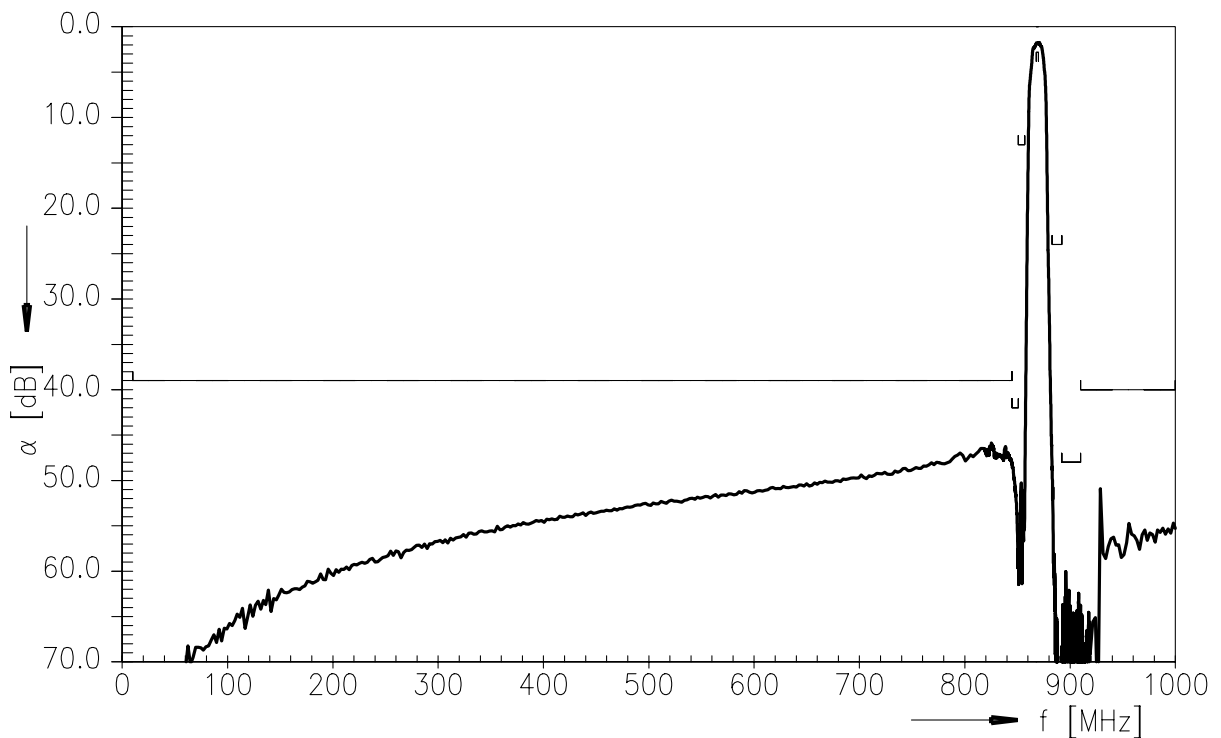
Data sheet



Frequency response (narrowband)



Frequency response (wideband)

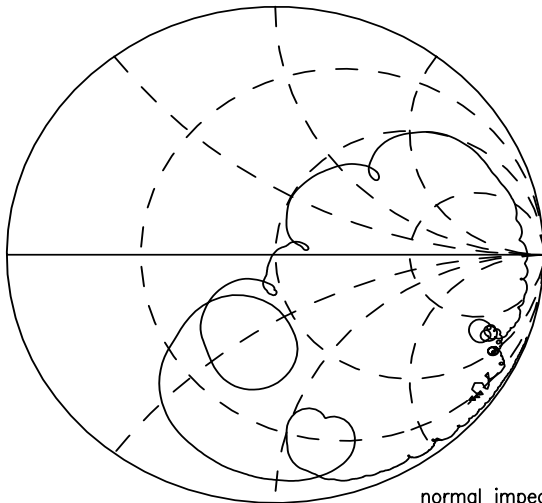


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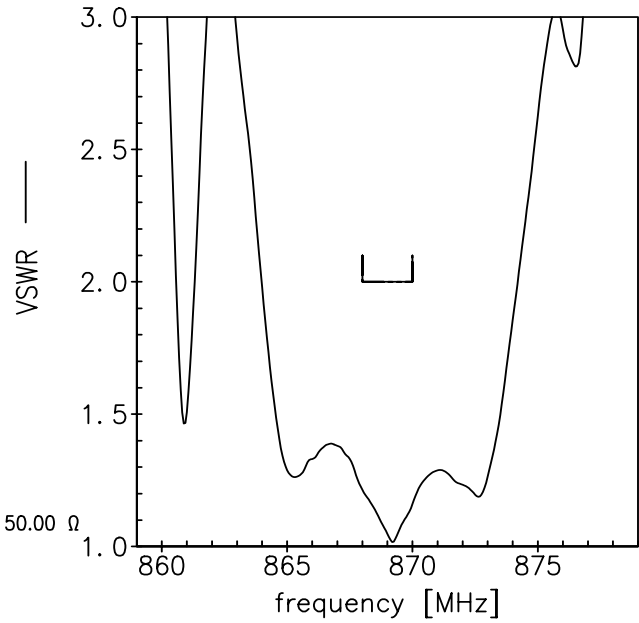


Smith chart

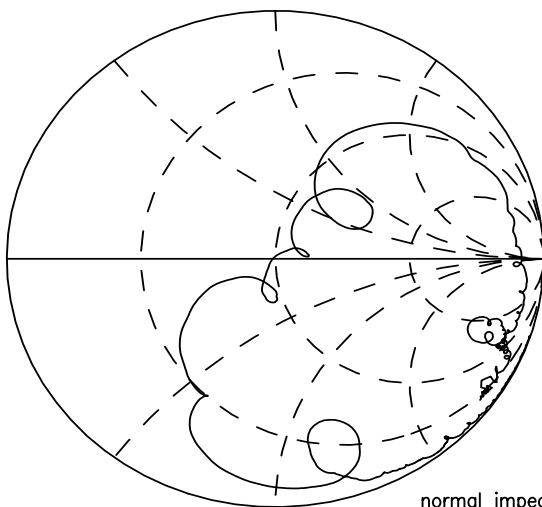
S₁₁ function



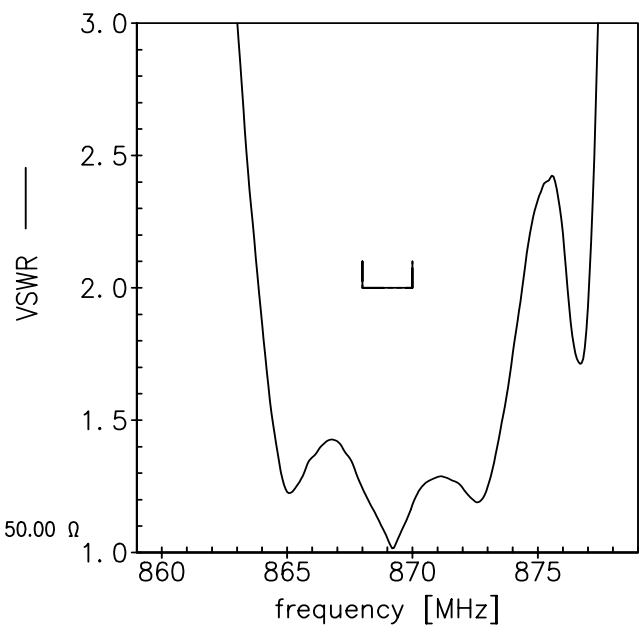
normal impedance: 50.00 Ω



S₂₂ function



normal impedance: 50.00 Ω





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.

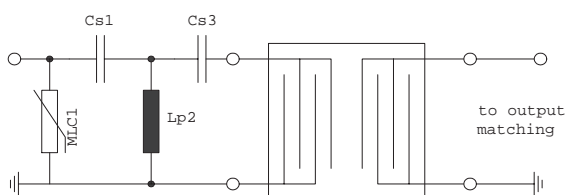


Fig. 1 MLC varistor plus ESD matching

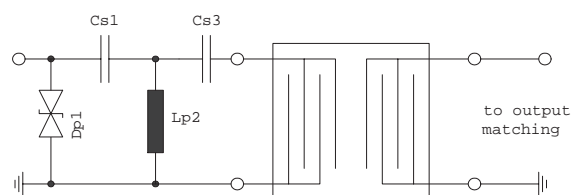


Fig. 2 Suppressor diode plus ESD matching

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

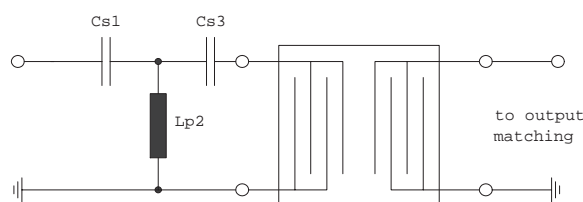


Fig. 3 3rd order high-pass structure for basic ESD protection

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	B4316
Ordering code	B39871B4316P810
Marking and package	C61157-A8-A9
Packaging	F61074-V8212-Z000
Date codes	L_1126
S-parameters	B4316_NB.s2p, B4316_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."
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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

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