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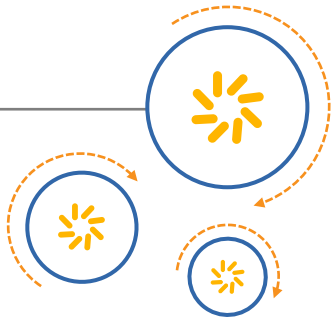
A Qualcomm – TDK Joint Venture



SAW Components

SAW filter

Short range devices

Series/type:	B4317
Ordering code:	B39921B4317P810
Date:	June 08, 2012
Version:	2.1

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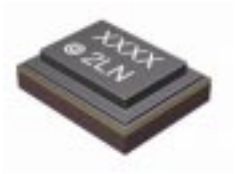
Datasheet SMD

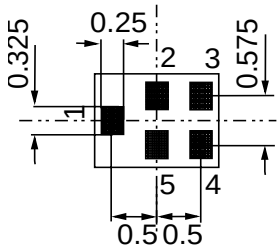
Application

- Low-loss RF filter for remote control receivers
- Unbalanced to balanced operation
- Impedance transformation from 50 Ω to 200 Ω
- Usable passband 26 MHz

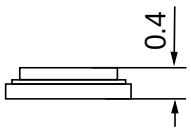


Features

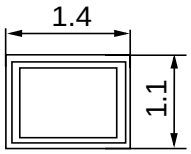
- Package size 1.4 x1.1 x 0.4 mm³
- Package code QCS5P
- RoHS compatible
- Approximate weight 0.003 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- AEC-Q200 qualified component family (operable temperature range -40˚C to +85˚C)
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



bottom view



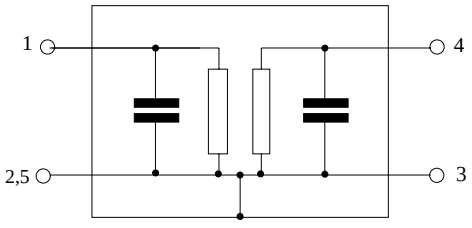
side view



top view

Pin configuration

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



Datasheet SMD

Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 200 Ω (balanced)

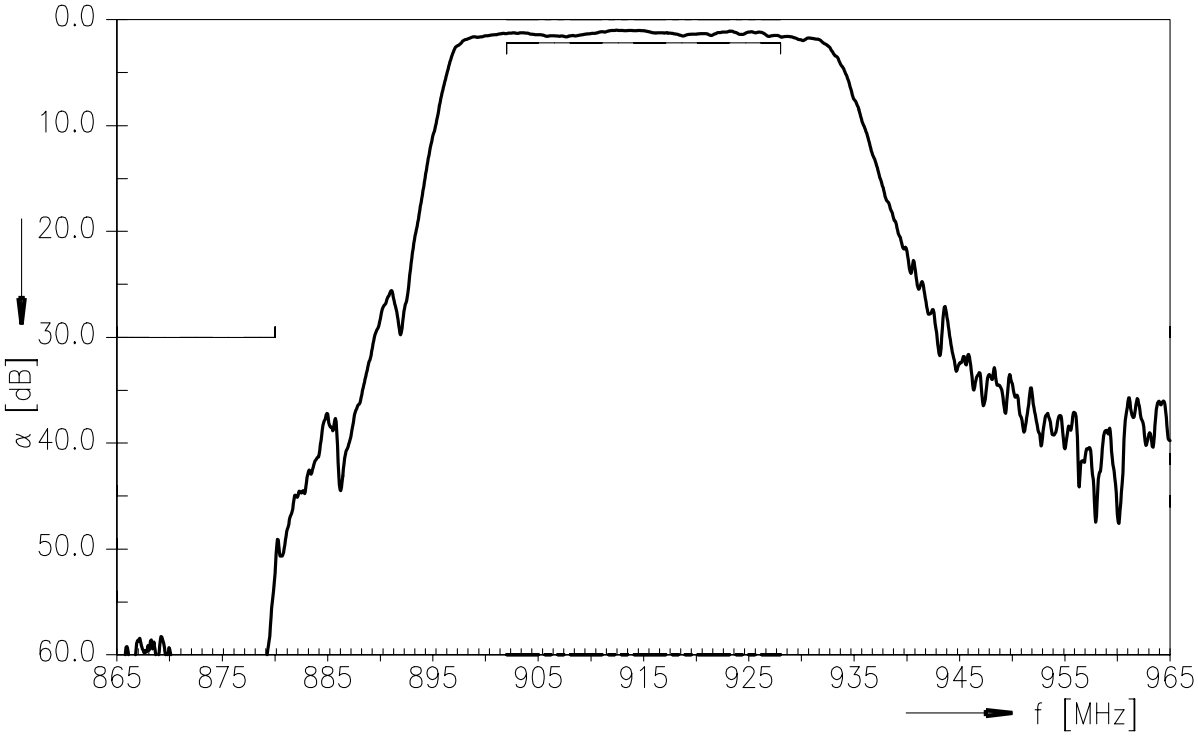
		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	915.00	—	MHz
Maximum insertion attenuation	α_{max}				
902.0 ... 928.0 MHz		—	1.7	2.2	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
902.0 ... 928.0 MHz		—	0.8	1.2	dB
Input VSWR					
902.0 ... 928.0 MHz		—	1.9	2.2	
Output VSWR					
902.0 ... 928.0 MHz		—	2.0	2.3	
Attenuation	α				
10.0 ... 700.0 MHz		55	72	—	dB
700.0 ... 770.0 MHz		50	74	—	dB
770.0 ... 850.0 MHz		45	64	—	dB
850.0 ... 880.0 MHz		30	45	—	dB
880.0 ... 894.0 MHz		—	17	—	dB
990.0 ... 1020.0 MHz		42	55	—	dB
1020.0 ... 1850.0 MHz		45	52	—	dB
1850.0 ... 3000.0 MHz		30	53	—	dB

Maximum ratings

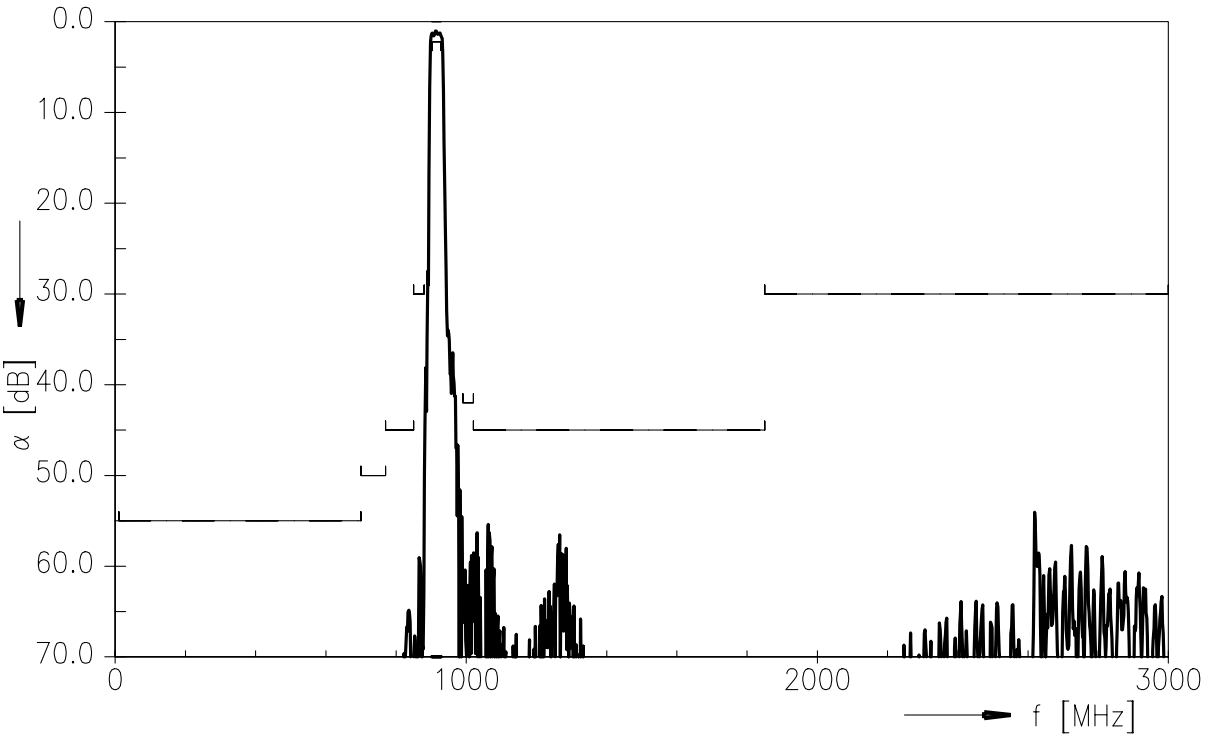
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	0	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 10 pulses
Input power at				source 50Ω , load 200Ω
902.0 ... 928.0 MHz	P_{IN}	15	dBm	cw

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

Frequency response (narrowband)

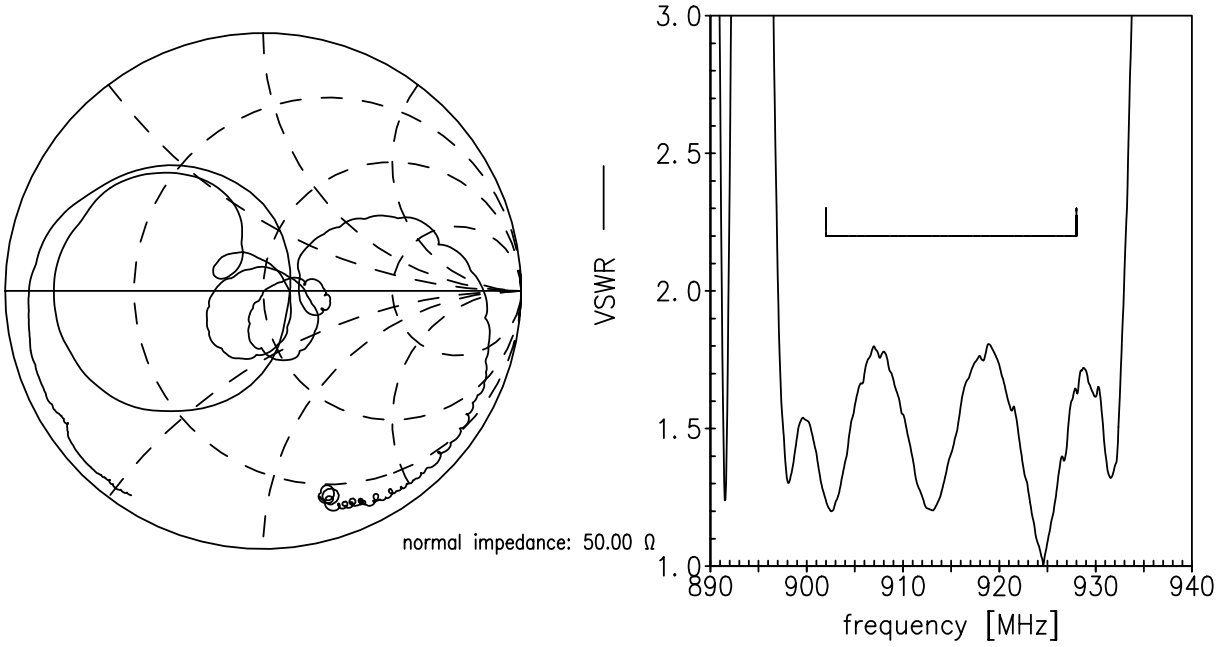


Frequency response (wideband)

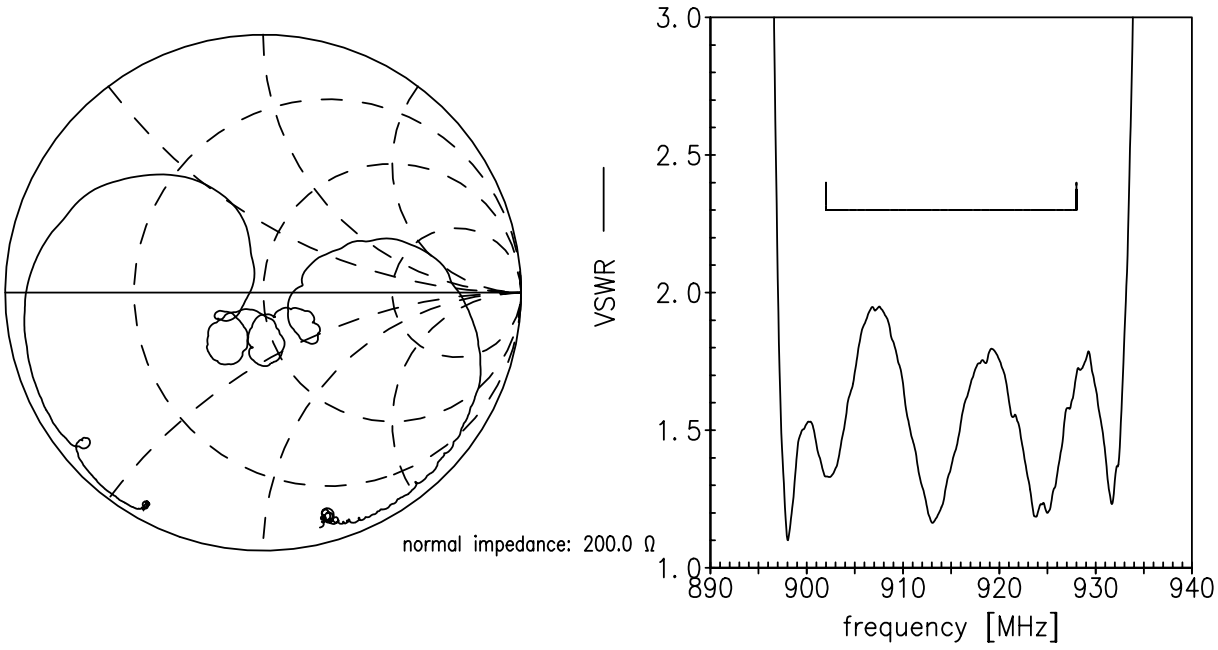


Smith chart

S_{11} function



S_{22} function



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.

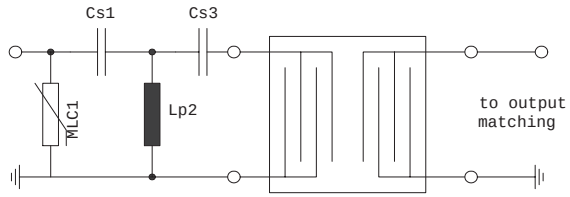


Fig. 1 MLC varistor plus ESD matching

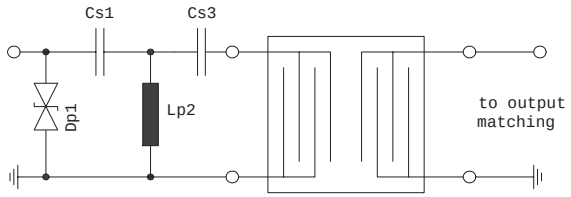


Fig. 2 Suppressor diode plus ESD matching

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

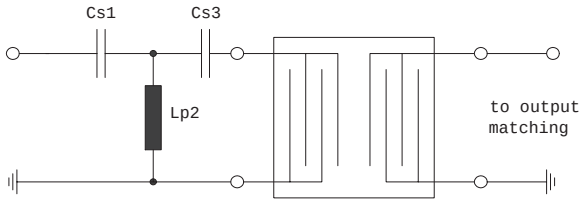


Fig. 3 3rd order high-pass structure for basic ESD protection

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	B4317
Ordering code	B39921B4317P810
Marking and package	C61157-A8-A9
Packaging	F61074-V8212-Z000
Date codes	L_1126
S-parameters	B4317_NB.s3p, B4317_WB.s3p 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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Published by EPCOS AG
Systems, Acoustics, Waves Business Group
P.O. Box 80 17 09, 81617 Munich, GERMANY

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