



RF360 Europe GmbH

A Qualcomm – TDK Joint Venture

SAW Components

SAW Rx filter

Automotive telematics

Series/type:	B4333
Ordering code:	B39741B4333P810
Date:	August 12, 2014
Version:	2.0

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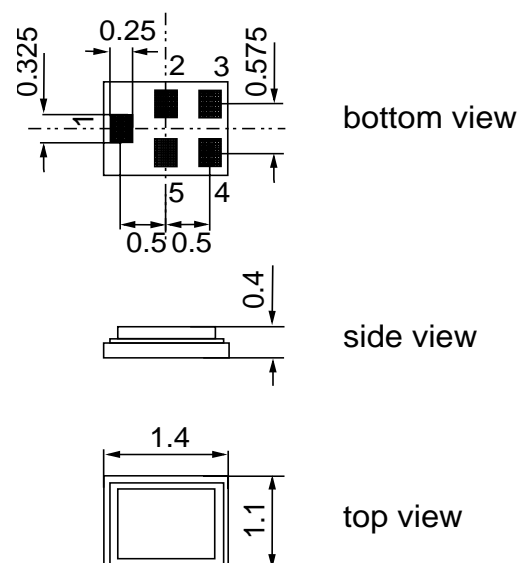
Data sheet


Application

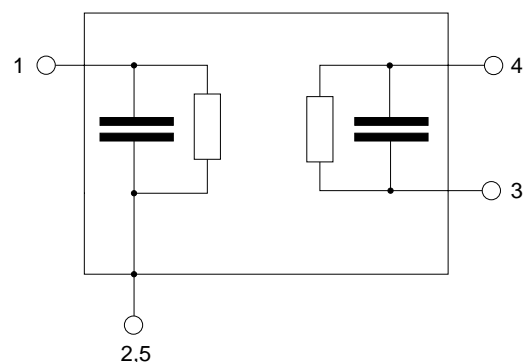
- Low-loss RF filter for LTE Band 17 system
- Usable bandwidth 12 MHz
- Unbalanced to balanced operation


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: $T = -30\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 100\ \Omega$ (balanced)

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	740.0	—	MHz
Maximum insertion attenuation	α_{\max}	—	1.8	2.8	dB
734.0 ... 746.0 MHz					
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.1	1.7	dB
734.0 ... 746.0 MHz					
Input VSWR		—	1.7	2.0	
734.0 ... 746.0 MHz					
Output VSWR		—	1.8	2.1	
734.0 ... 746.0 MHz					
Common mode rejection ratio		25	40	—	dB
734.0 ... 746.0 MHz					
Attenuation	α				
50.0 ... 686.0 MHz		50	68	—	dB
704.0 ... 716.0 MHz		40	43	—	dB
716.0 ... 722.0 MHz		35	37	—	dB
722.0 ... 725.0 MHz		29	31	—	dB
725.0 ... 728.0 MHz		9	27	—	dB
777.0 ... 793.0 MHz		26	29	—	dB
793.0 ... 1438.0 MHz		40	48	—	dB
1438.0 ... 1462.0 MHz		40	65	—	dB
1468.0 ... 1492.0 MHz		40	65	—	dB
1570.0 ... 1610.0 MHz		50	65	—	dB
2124.0 ... 2178.0 MHz		40	63	—	dB
2202.0 ... 2238.0 MHz		26	39	—	dB
2400.0 ... 2484.0 MHz		50	64	—	dB
2496.0 ... 2690.0 MHz		45	62	—	dB
2936.0 ... 2984.0 MHz		45	61	—	dB
3400.0 ... 3800.0 MHz		45	60	—	dB
4404.0 ... 4476.0 MHz		40	58	—	dB
4900.0 ... 5850.0 MHz		40	53	—	dB
5872.0 ... 5968.0 MHz		40	57	—	dB

Data sheet

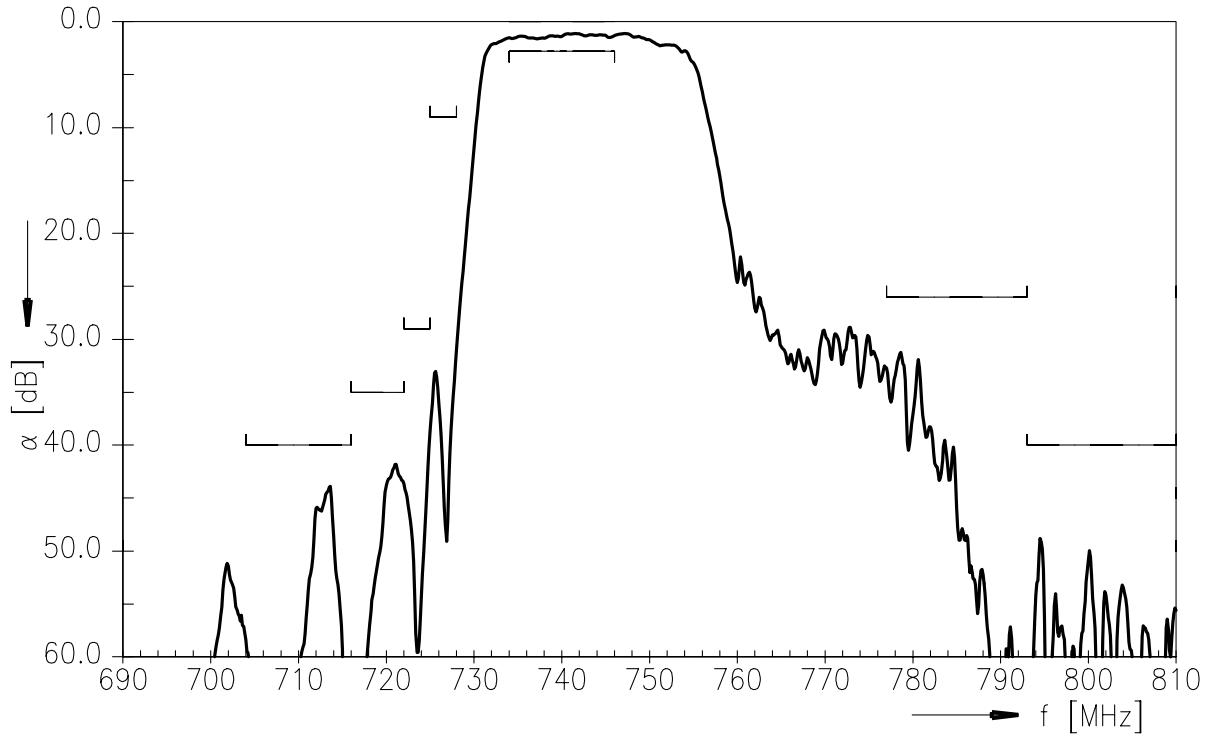

Maximum ratings

Operable temperature range	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	0	V	
Input Power at 704.0 ... 716.0 MHz	P _{IN}	15	dBm	

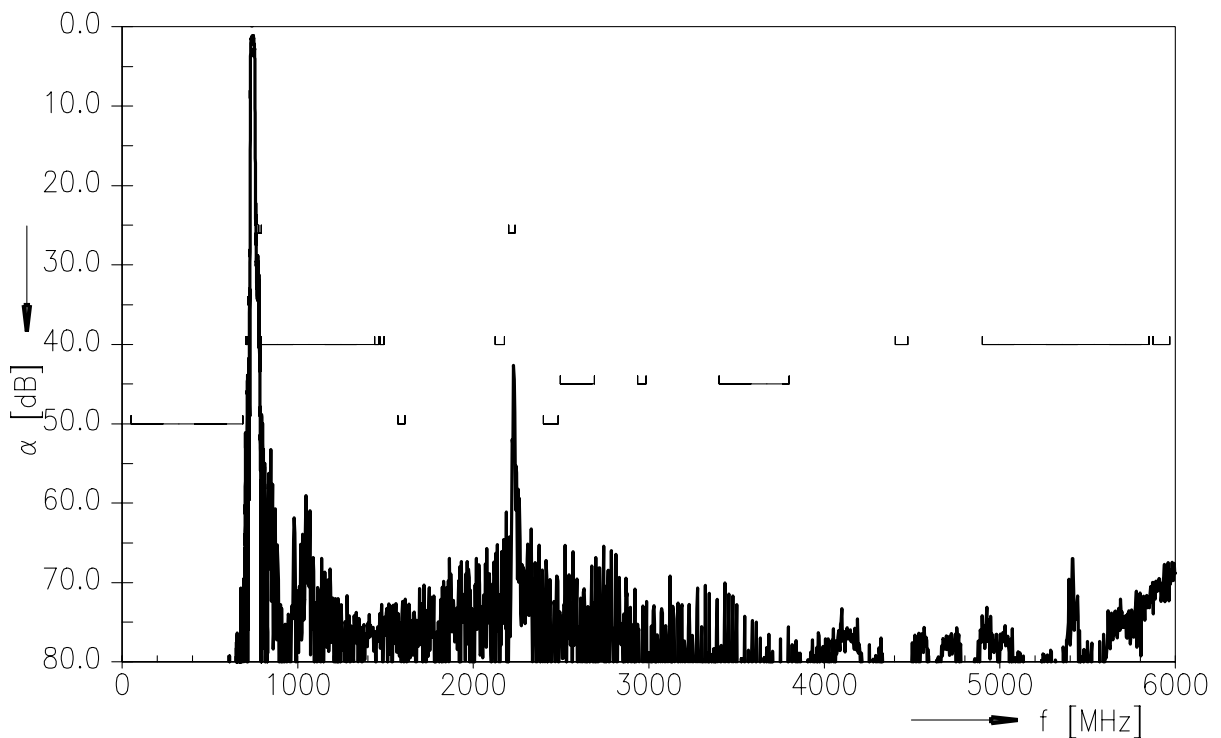
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Transfer function



Transfer function (wideband)

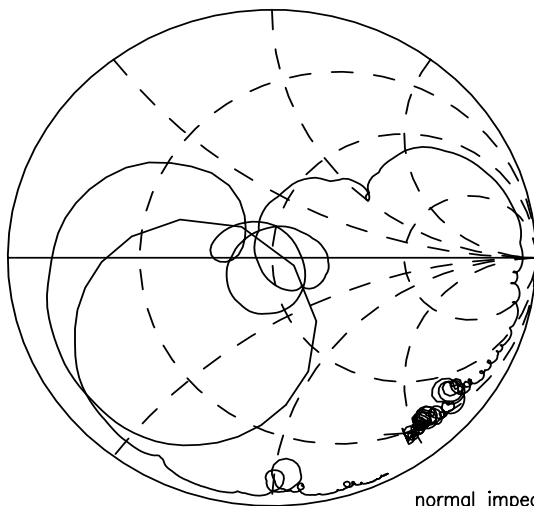


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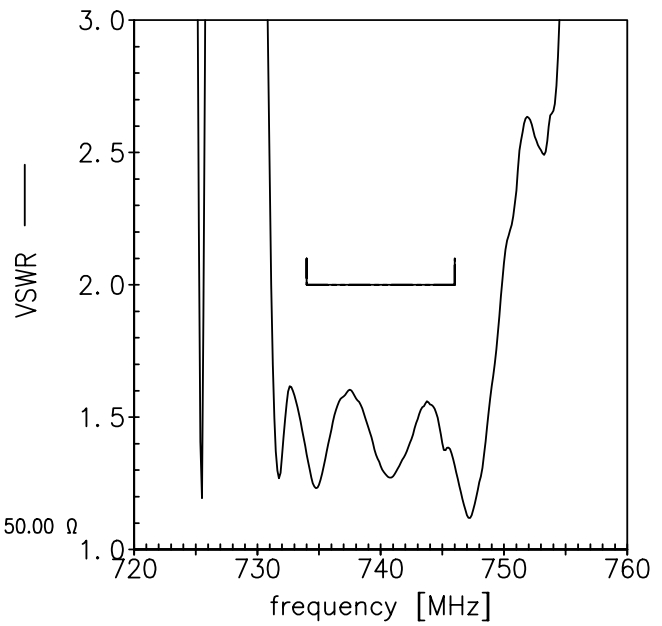


Smith chart

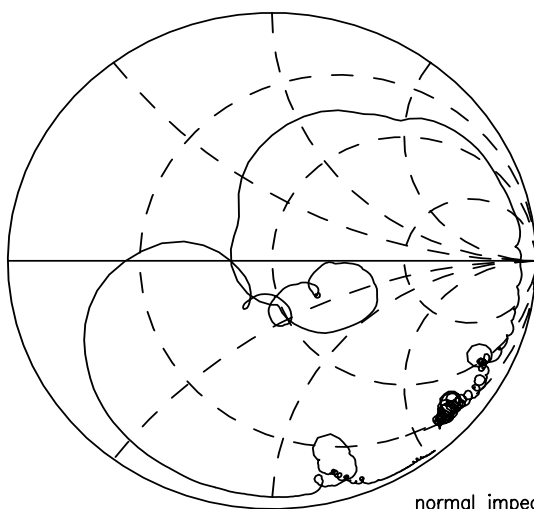
S_{11} function



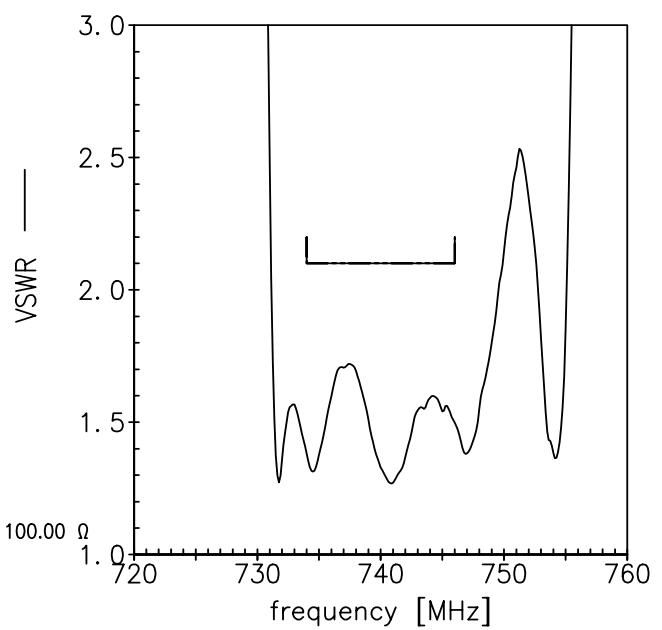
normal impedance: 50.00 Ω



S_{22} function



normal impedance: 100.00 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.

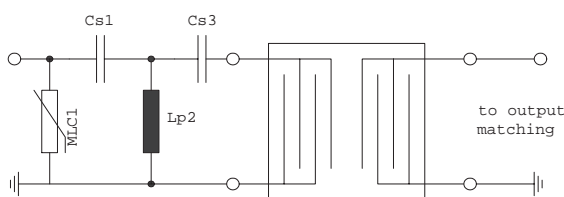


Fig. 1 MLC varistor plus ESD matching

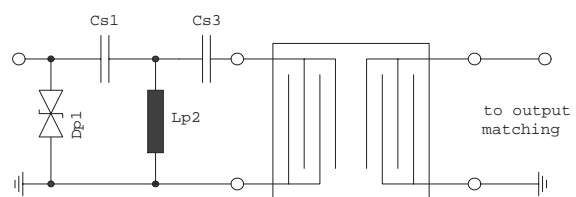


Fig. 2 Suppressor diode plus ESD matching

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

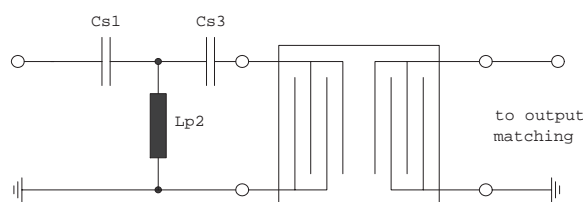


Fig. 3 3rd order high-pass structure for basic ESD protection

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”.

Data sheet


References

Type	B4333
Ordering code	B39741B4333P810
Marking and package	C61157-A8-A9
Packaging	F61074-V8237-Z000
Date codes	L_1126
S-parameters	B4333_NB.s3p, B4333_WB.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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