SAW Components

SAW band-stop filter

Automotive telematics

Series/type:	**B3471**
Ordering code:	**B39232B3471H910**
Date:	October 22, 2013
Version:	2.0

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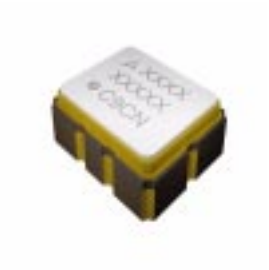
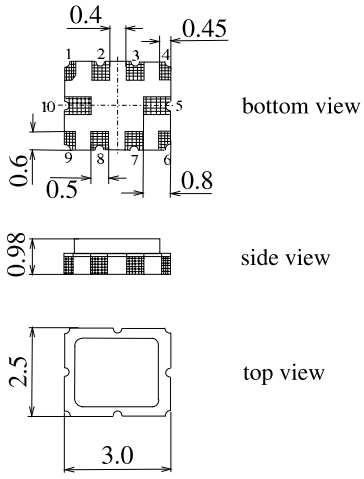
Application

- Low-loss RF band-stop filter for SIRIUS/XM
- Very low insertion loss
- Four usable passbands



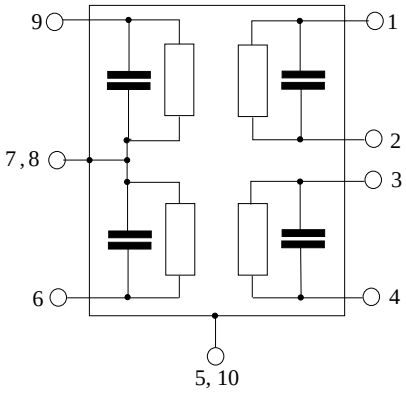
Features

- Package size 3.0 x 2.5 x 0.98 mm³
- Package code QCC10G
- RoHS compatible
- Approximate weight 0.027 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- Lead free soldering compatible with J - STD20C
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

■	1, 2	Coupling pin
■	3, 4	Coupling pin
■	6	Output
■	9	Input
■	5, 7, 8, 10	Case ground



Data sheet SMD

Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω and matching network
Terminating load impedance: Z_L = 50 Ω and matching network

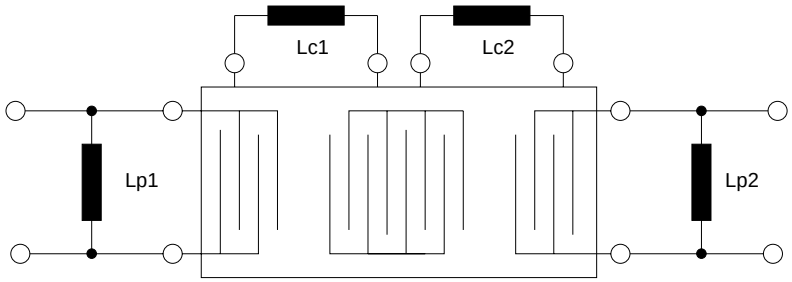
		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	2332.5	—	MHz
Maximum insertion attenuation[1)]	α_{max}				
698.00 ... 960.00 MHz		—	0.9	1.3	dB
1440.00 ... 1520.00 MHz		—	1.6	2.2	dB
1710.00 ... 2200.00 MHz		—	1.5	2.2	dB
2496.00 ... 2690.00 MHz		—	2.0	2.5	dB
Attenuation	α				
2320.00 ... 2345.00 MHz		30	37	—	dB

1) incl. loss in matching elements (QL= 90 @ 1000 MHz).

Maximum ratings

Operable temperature range	T	–45/+125	˚C	
Storage temperature range	T_{stg}	–45/+125	˚C	
DC voltage	V_{DC}	6	V	
Source power	P_S			source impedance 50 Ω
824.0... 849.0 MHz		33.0	dBm	GSM signal, duty cycle 4:8
1850.0... 1910.0 MHz		28.0	dBm	for 10,000 hours at 85˚C

Matching network to 50 Ω and coupling coil

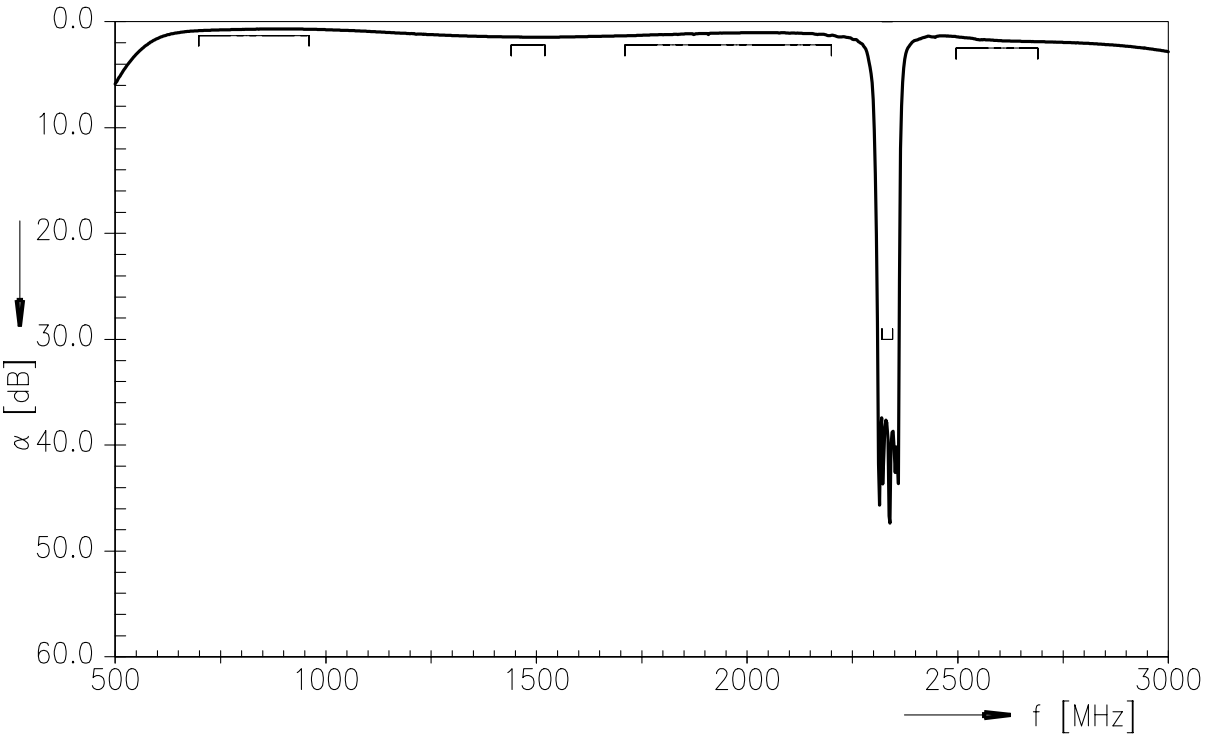


L_{p1} = 10.0 nH
L_{c1} = 2.4 nH
L_{c2} = 2.4 nH
L_{p2} = 10.0 nH

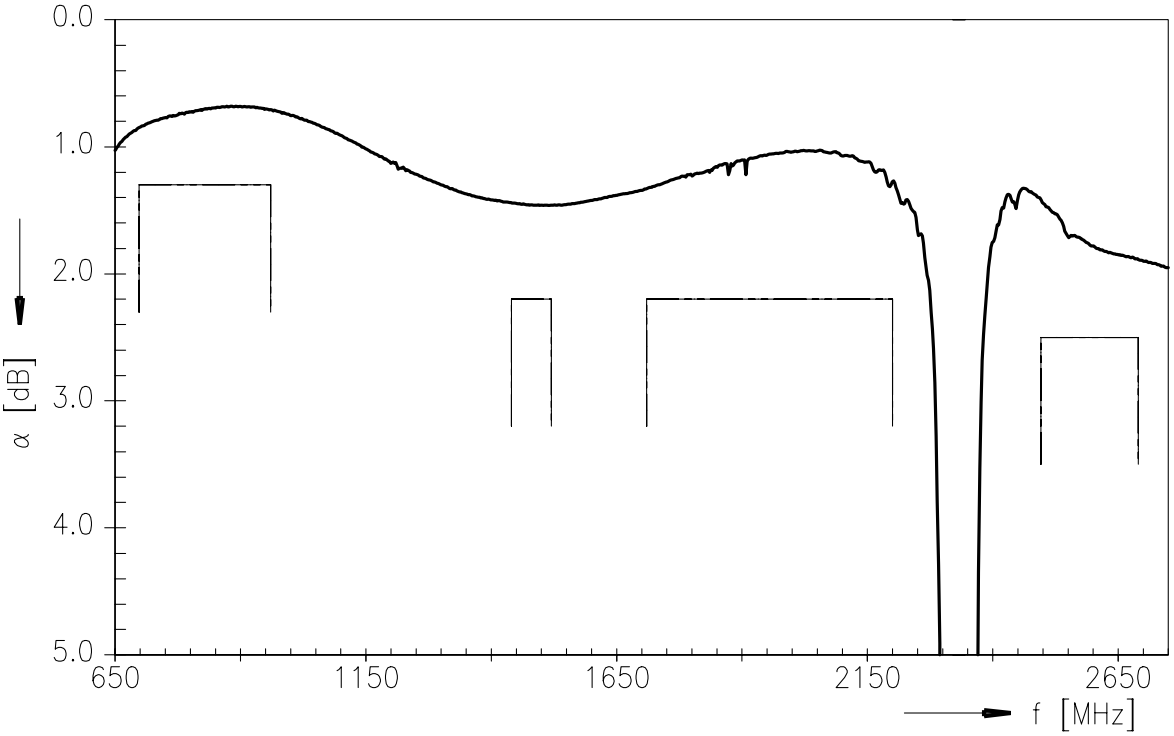
Q factors of inductors:

90 @1000 MHz

Transfer function



Transfer function (passband)



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.

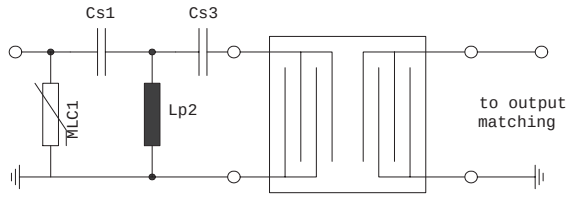


Fig. 1 MLC varistor plus ESD matching

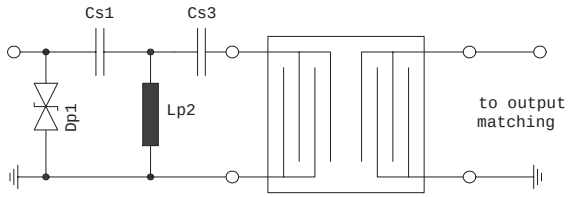


Fig. 2 Suppressor diode plus ESD matching

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

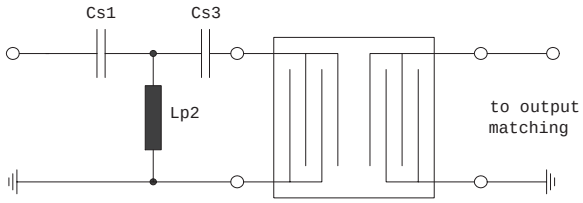


Fig. 3 3rd order high-pass structure for basic ESD protection

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	B3471
Ordering code	B39232B3471H910
Marking and package	C61157-A7-A142
Packaging	F61074-V8174-Z000
Date codes	L_1126
S-parameters	B3471_WB.s2p 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 8th, 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.
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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