SAW Components

SAW Diplexer

Automotive telematics

Series/type:	**B3518**
Ordering code:	**B39162B3518H910**
Date:	May 16, 2013
Version:	2.3

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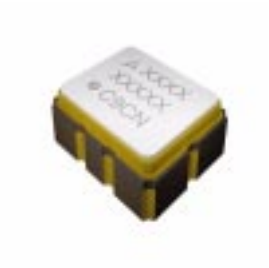
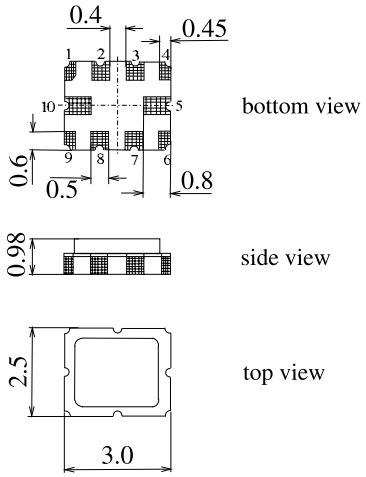
Application

- Low-loss Diplexer for GPS and GLONASS applications



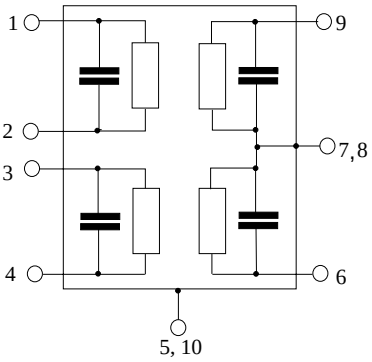
Features

- 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**echnolog (**SMT**)
- Ni, gold-plated terminals
- Lead free soldering compatible with J - STD20C
- AEC-Q200 qualified component family
- **E**lectrostactic **S**ensitive **D**evice (**ESD**)



Pin configuration[1)]

■	3	Input [Filter 1]
■	2	Input [Filter 2]
■	6	Output [Filter 1]
■	9	Output [Filter 2]
■	5,7,8,10	Case ground
■	1,4	to be grounded



1) The recommended pin configuration usually offers best suppression of electrical crosstalk. The filter characteristics refer to this configuration.

Characteristics Filter 1 (GPS)

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 = 50Ω

		B3518			
		min.	**typ.**	**max.**	
Center frequency	f_C	—	1575.00	—	MHz
Maximum insertion attenuation	α_{max}				
1570.00 ... 1580.00 MHz		—	3.8	4.8	dB
Amplitude ripple	$\Delta\alpha$				
1570.00 ... 1580.00 MHz		—	1.0	2.0	dB
VSWR					
Input 1570.00 ... 1580.00 MHz		—	2.1	2.4	
Output 1570.00 ... 1580.00 MHz		—	2.0	2.3	
Attenuation	α				
10.00 ... 1000.00 MHz		50	60	—	dB
1000.00 ... 1500.00 MHz		29	34	—	dB
1597.00 ... 1607.00 MHz		15	24	—	dB
1625.00 ... 1660.00 MHz		37	47	—	dB
1680.00 ... 2000.00 MHz		34	38	—	dB

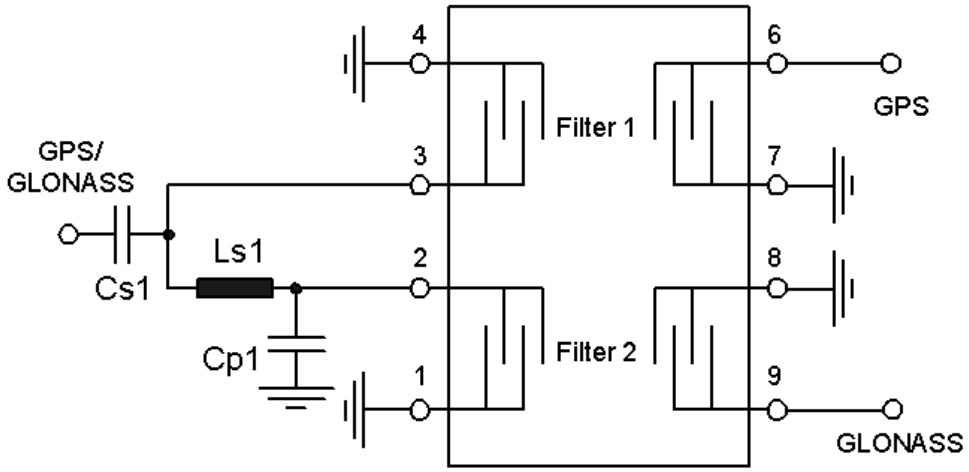
Characteristics Filter 2 (GLONASS)

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 = 50Ω

		B3518			
		min.	typ.	max.	
Center frequency	f_C	—	1602.00	—	MHz
Maximum insertion attenuation	α_{max}				
1597.00 ... 1607.00 MHz		—	3.6	4.5	dB
Amplitude ripple	$\Delta\alpha$				
1597.00 ... 1607.00 MHz		—	1.0	1.8	dB
VSWR					
Input 1597.00 ... 1607.00 MHz		—	2.15	2.45	
Output 1597.00 ... 1607.00 MHz		—	1.8	2.3	
Group delay ripple[1)] (p-p)					
1597.0 ... 1607.0 MHz		—	5	25	ns
Attenuation	α				
10.00 ... 1000.00 MHz		50	55	—	dB
1000.00 ... 1500.00 MHz		29	34	—	dB
1570.00 ... 1580.00 MHz		12	22	—	dB
1625.00 ... 1640.00 MHz		6	17	—	dB
1640.00 ... 1660.00 MHz		27	37	—	dB
1680.00 ... 2000.00 MHz		35	40	—	dB

1) Averaged over 500 kHz

Matching network to 50 Ω



Cs1 = 6.8pF

Ls1 = 5.6nH

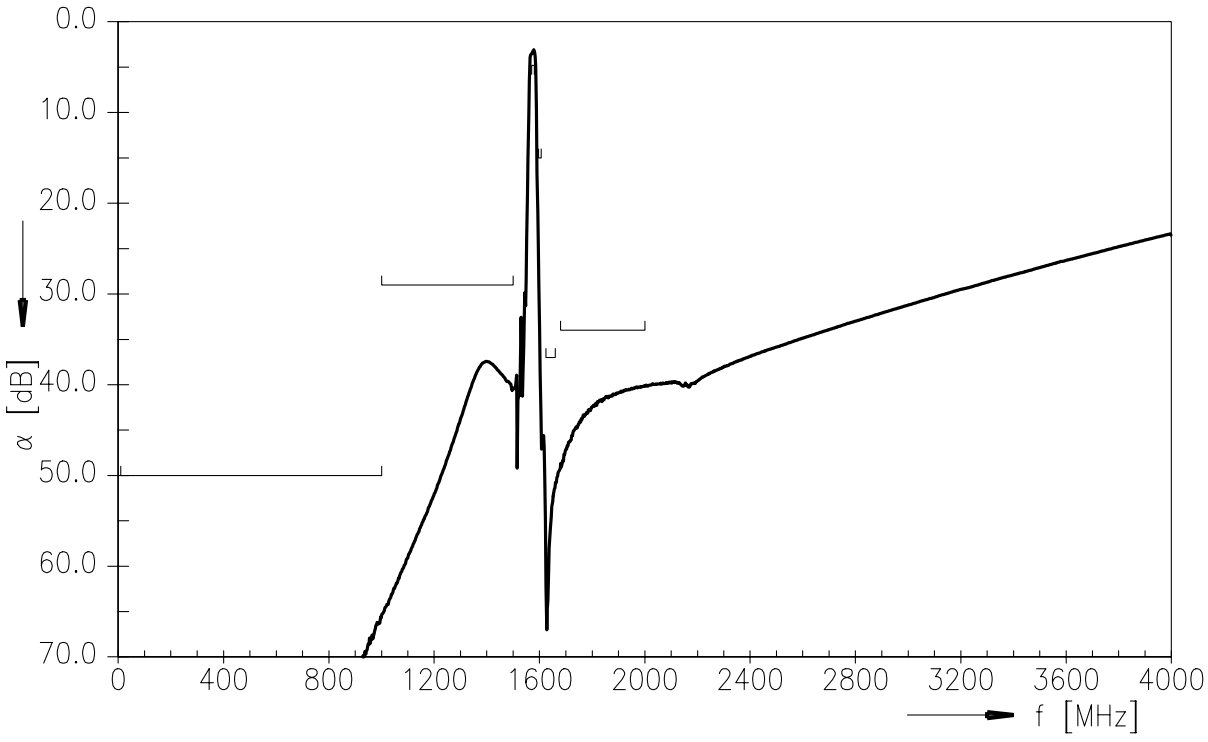
Cp1 = 0.2pF

Maximum ratings

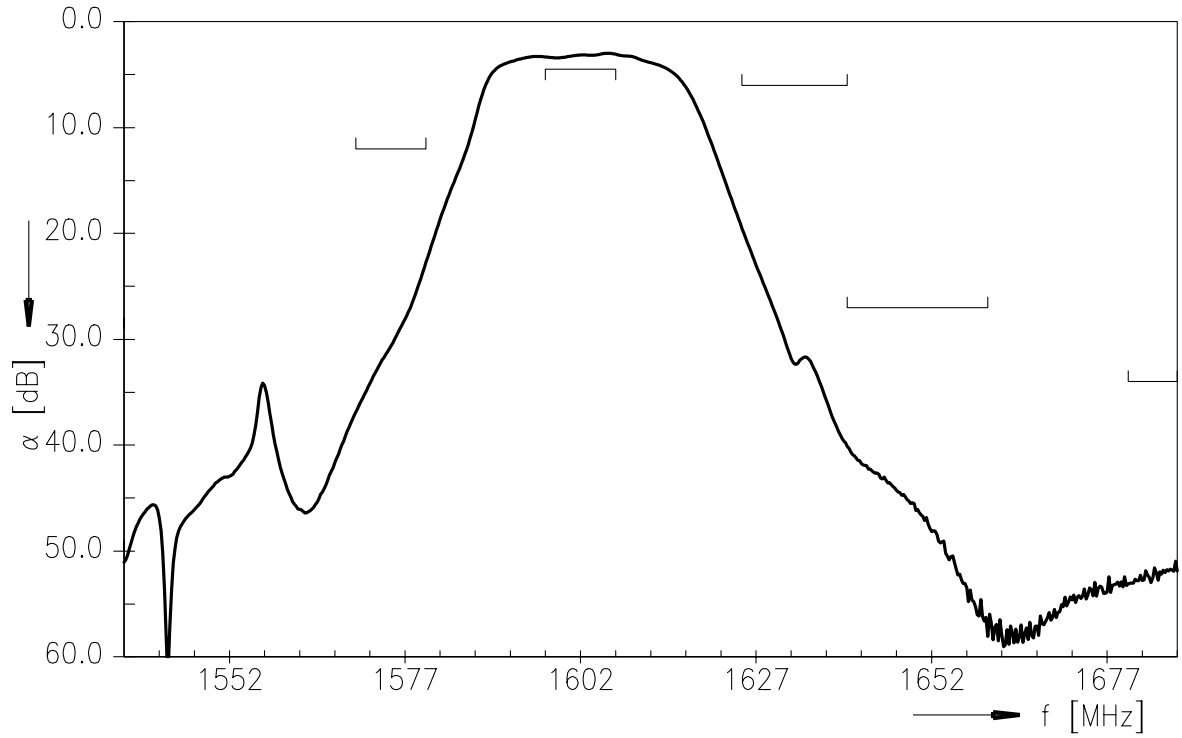
Operable temperature range	T	–45/+125	˚C	
Storage temperature range	T_{stg}	–45/+125	˚C	
DC voltage	V_{DC}	6	V	
Input power	P_{IN}	10	dBm	

Transfer function Filter 1

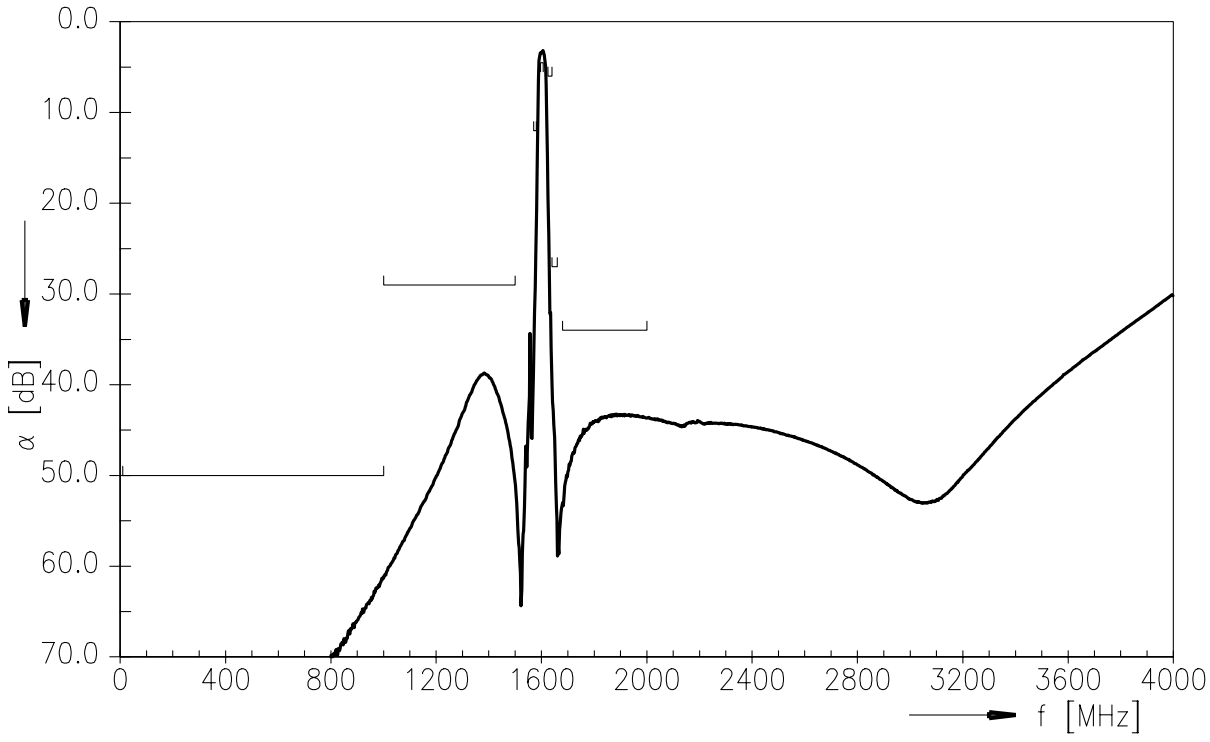
Transfer function Filter 1 (wideband)



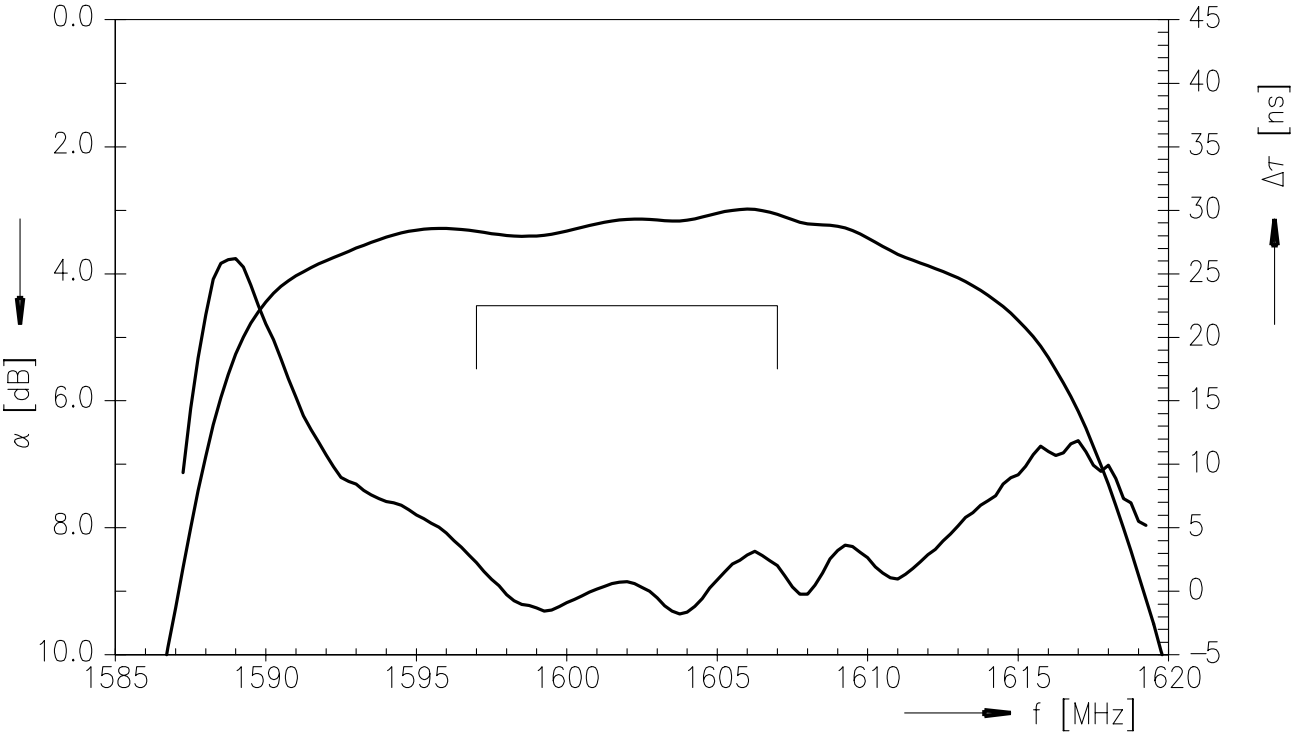
Transfer function Filter 2



Transfer function Filter 2 (wideband)



Group delay time Filter 2



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.

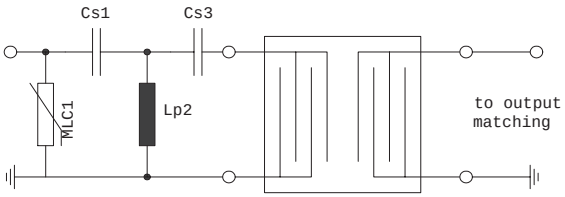


Fig. 1 MLC varistor plus ESD matching

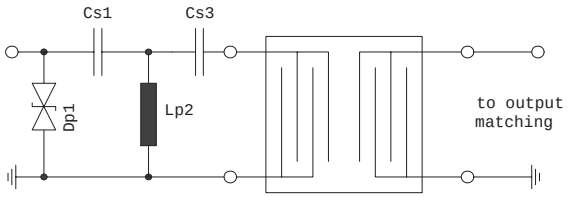


Fig. 2 Suppressor diode plus ESD matching

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

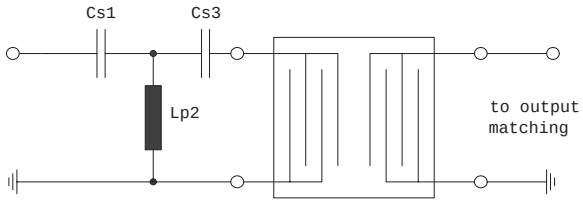


Fig. 3 3rd order high-pass structure for basic ESD protection

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	B3518
Ordering code	B39162B3518H910
Marking and package	C61157-A7-A142
Packaging	F61074-V8174-Z000
Date codes	L_1126
S-parameters	B3518_NB.s4p, B3518_WB.s4p 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

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