



RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



## SAW Components

### GPS/GLONASS Extractor Filter

Automotive telematics

Series/type:	B4340
Ordering code:	B39162B4340P810
Date:	August 13, 2014
Version:	2.0

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# SAW Components

## GPS/GLONASS Extractor Filter

Automotive telematics

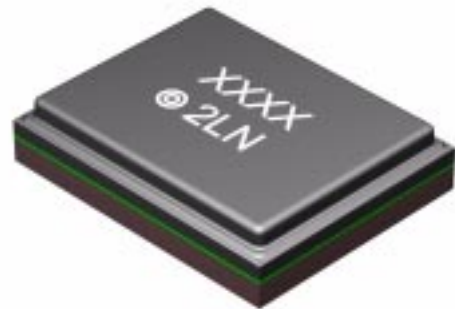
<b>Series/type:</b>	<b>B4340</b>
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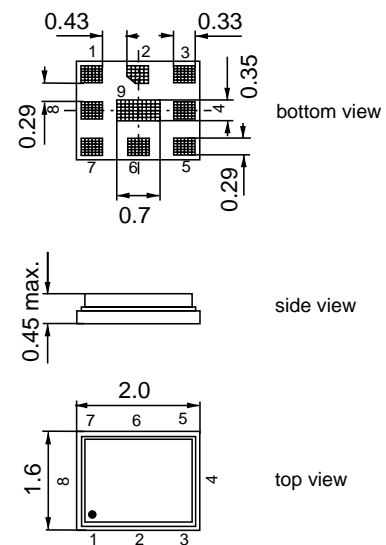
### Application

- Low loss GPS/GLONASS Extractor
- Using common antenna for GPS/GLONASS and NON-GPS/GLONASS bands (Cellular, PCS, WCD-MA bands)
- Low insertion attenuation in GPS/GLONASS and NON-GPS/GLONASS bands
- Low amplitude ripple
- Low group delay ripple



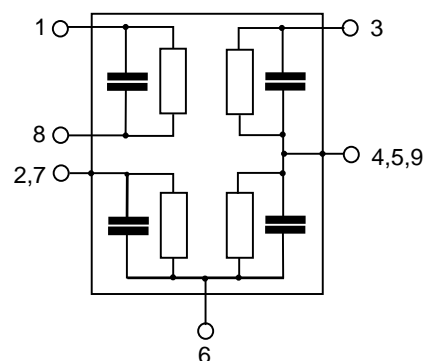
### Features

- Package size 2.0 x 1.6 mm<sup>2</sup>
- Package height max. 0.45 mm
- RoHS compatible
- Approximate weight 0.005 g
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- AEC-Q200 qualified component family (operable temperature range of -40 °C to +85 °C)



### Pin configuration

- 6 ANT input
- 1 GPS/GLONASS output
- 3 NON-GPS/GLONASS output
- 2, 4, 5, 7, 8, 9 To be grounded



**SAW Components**
**B4340**
**GPS/GLONASS Extractor Filter**
**832 / 1469.4 / 1575.42 / 1601.72 / 2200**

Data sheet


**Characteristics**

Temperature range for specification:	$T = -40\text{ °C to }+85\text{ °C}$
GPS/GLONASS terminating impedance:	$Z_{\text{GPGL}} = 50\ \Omega$
ANT terminating impedance:	$Z_{\text{ANT}} = 50\ \Omega \parallel 6.8\text{ nH}$
NON-GPS/GLONASS terminating impedance:	$Z_{\text{NON}} = 50\ \Omega + 3.3\text{ nH and } \parallel 1.3\text{ pF}$

<b>Characteristics GPS/GLONASS</b>		<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>	
<b>Maximum insertion attenuation</b>					
	$\alpha_{\text{max}}$				
1574.42 ... 1576.42 MHz		—	1.6	2.4	dB
1565.42 ... 1585.42 MHz		—	2.1	3.3	dB
1597.55 ... 1605.89 MHz		—	2.4	3.3	dB
<b>Amplitude ripple (p-p)</b>					
	$\Delta\alpha$				
1574.42 ... 1576.42 MHz		—	0.4	1.1	dB
1565.42 ... 1585.42 MHz		—	0.8	2.2	dB
1597.55 ... 1605.89 MHz		—	0.8	2.2	dB
<b>Group delay ripple<sup>1)</sup> (p-p)</b>					
	$\Delta\tau$				
1597.55 ... 1605.89 MHz		—	4	—	ns
<b>VSWR (Antenna port)</b>					
1574.42 ... 1576.42 MHz		—	1.7	2.0	
1565.42 ... 1585.42 MHz		—	1.5	2.0	
1597.55 ... 1605.89 MHz		—	1.5	2.0	
<b>VSWR (GPS/GLONASS port)</b>					
1574.42 ... 1576.42 MHz		—	1.5	2.0	
1565.42 ... 1585.42 MHz		—	1.4	2.0	
1597.55 ... 1605.89 MHz		—	1.4	2.0	
<b>Attenuation ANT-GPS/GLONASS</b>					
	$\alpha$				
50.0 ... 824.0 MHz		31	34	—	dB
824.0 ... 960.0 MHz		33	36	—	dB
1427.9 ... 1510.9 MHz		35	41	—	dB
1710.0 ... 1995.0 MHz		35	39	—	dB
2110.0 ... 2170.0 MHz		35	40	—	dB
2400.0 ... 2500.0 MHz		35	40	—	dB
2500.0 ... 2690.0 MHz		35	40	—	dB

<sup>1)</sup> Measured with an aperture of 2 MHz

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 ANT terminating impedance:  $Z_{\text{ANT}} = 50\ \Omega \parallel 6.8\text{ nH}$   
 NON-GPS/GLONASS terminating impedance:  $Z_{\text{NON}} = 50\ \Omega + 3.3\text{ nH}$  and  $\parallel 1.3\text{ pF}$

Characteristics NON-GPS/GLONASS				min.	typ. @ 25 °C	max.	
<b>Maximum insertion attenuation</b>							
			$\alpha_{\text{max}}$				
704.0	...	824.0	MHz	—	1.0	1.6	dB
824.0	...	960.0	MHz	—	0.9	1.3	dB
1427.9	...	1462.9	MHz	—	0.9	1.2	dB
1475.9	...	1510.9	MHz	—	1.0	1.3	dB
1710.0	...	1995.0	MHz	—	1.4	1.8	dB
2110.0	...	2170.0	MHz	—	1.4	1.8	dB
2400.0	...	2483.5	MHz	—	1.0	1.4	dB
2500.0	...	2690.0	MHz	—	0.9	1.2	dB
<b>VSWR (Antenna port)</b>							
704.0	...	824.0	MHz	—	1.5	2.0	
824.0	...	960.0	MHz	—	1.5	2.0	
1427.9	...	1462.9	MHz	—	1.8	2.4	
1475.9	...	1510.9	MHz	—	1.9	2.3	
1710.0	...	1995.0	MHz	—	1.7	2.0	
2110.0	...	2170.0	MHz	—	1.7	2.0	
2400.0	...	2483.5	MHz	—	1.5	1.9	
2500.0	...	2690.0	MHz	—	1.5	2.0	
<b>VSWR (NON-GPS/GLONASS port)</b>							
704.0	...	824.0	MHz	—	1.7	2.0	
824.0	...	960.0	MHz	—	1.7	2.0	
1427.9	...	1462.9	MHz	—	1.7	2.4	
1475.9	...	1510.9	MHz	—	1.8	2.3	
1710.0	...	1995.0	MHz	—	1.8	2.1	
2110.0	...	2170.0	MHz	—	1.8	2.1	
2400.0	...	2483.5	MHz	—	1.5	1.9	
2500.0	...	2690.0	MHz	—	1.5	2.0	

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NON-GPS/GLONASS terminating impedance:  $Z_{\text{NON}} = 50\ \Omega + 3.3\text{ nH and } \parallel 1.3\text{ pF}$ 

Isolation between NON and GPS/GLONASS				min.	typ. @ 25 °C	max.	
704.0	...	824.0	MHz	33	35	—	dB
824.0	...	960.0	MHz	33	36	—	dB
1427.9	...	1510.9	MHz	35	40	—	dB
1710.0	...	1995.0	MHz	35	40	—	dB
2110.0	...	2170.0	MHz	35	40	—	dB
2400.0	...	2483.5	MHz	35	40	—	dB
2500.0	...	2690.0	MHz	35	40	—	dB

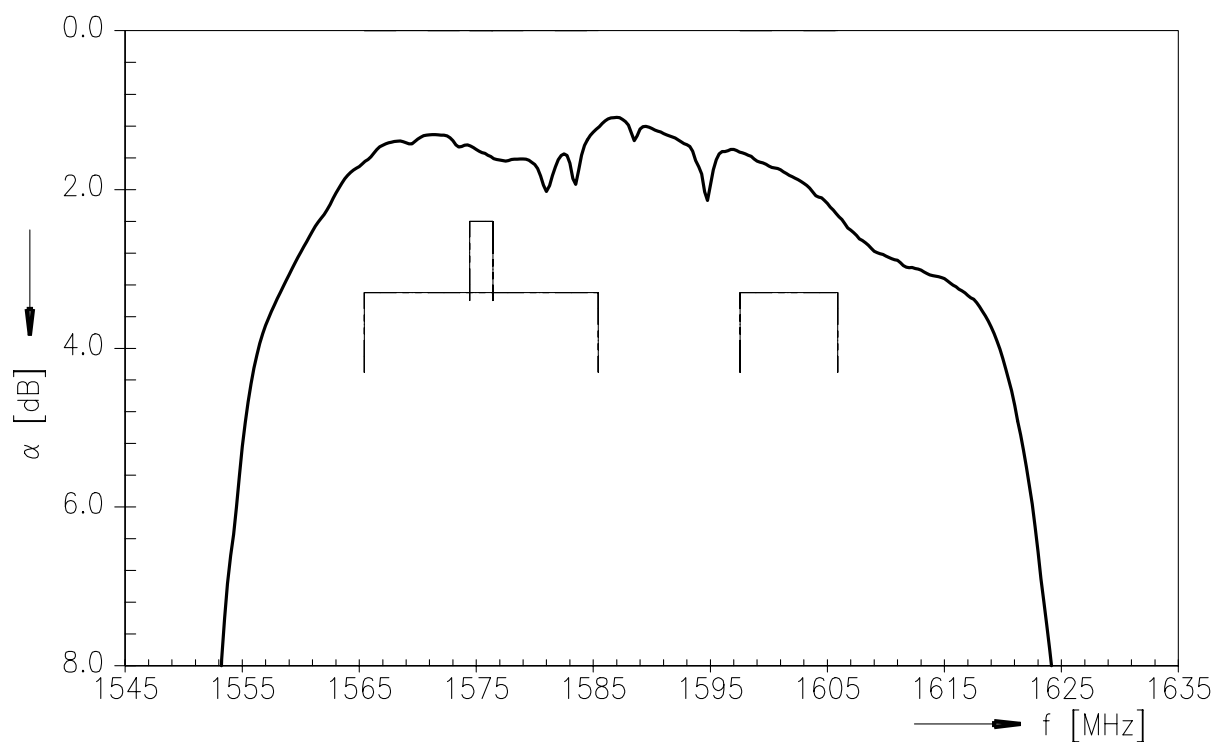
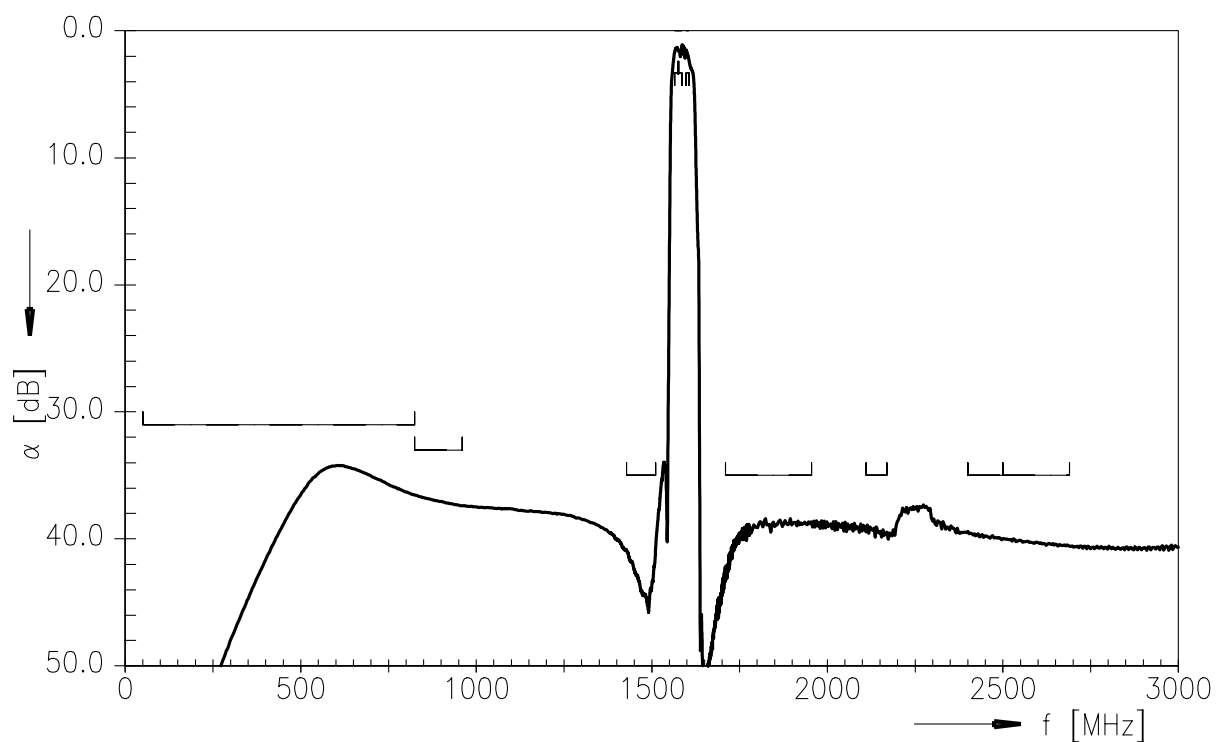
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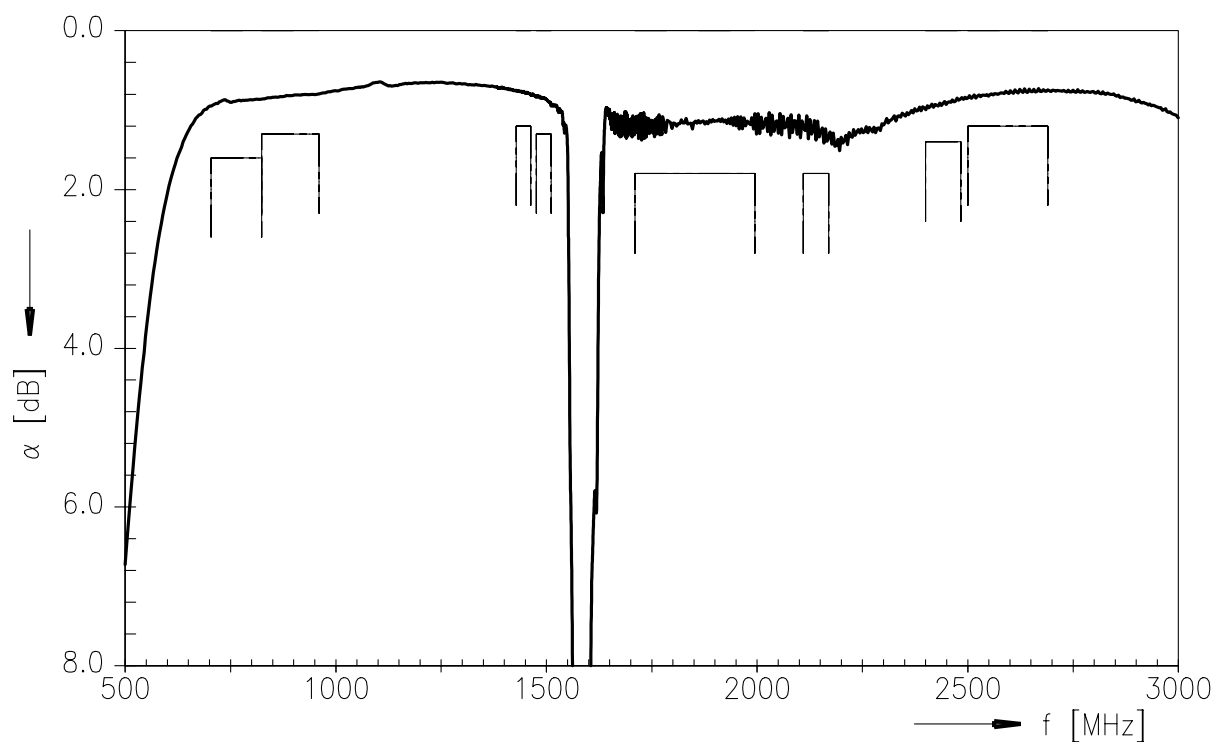
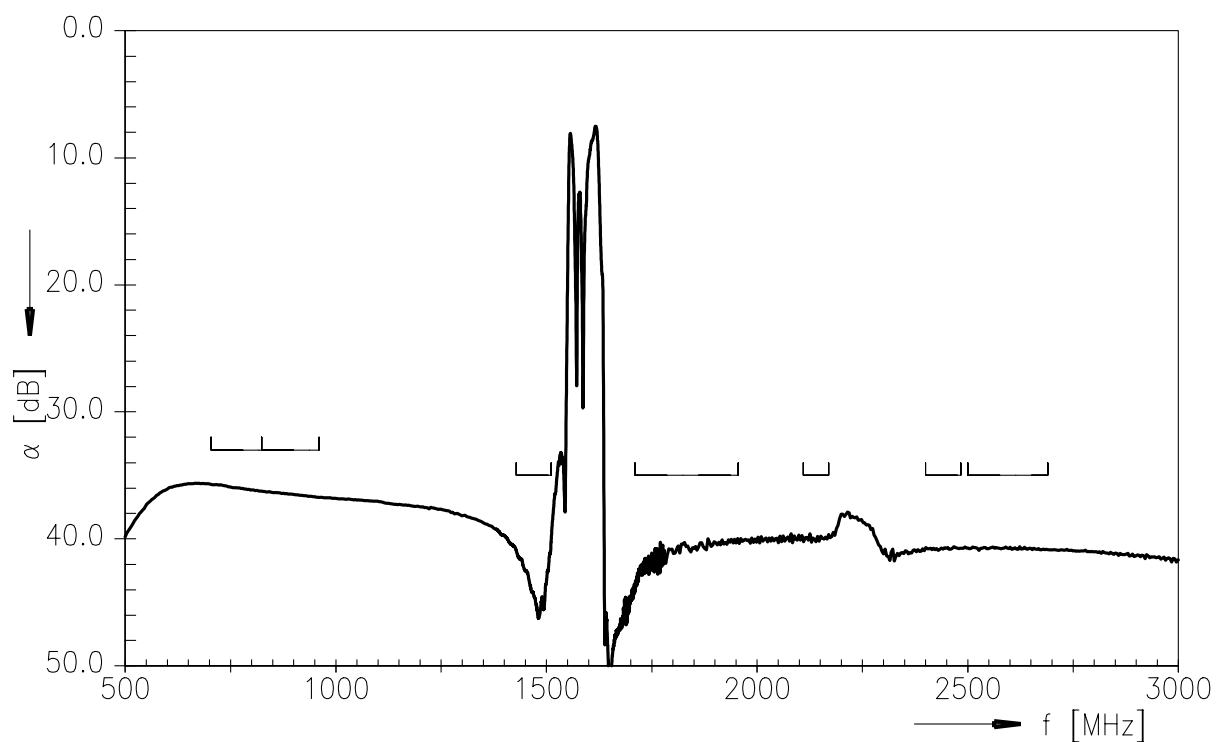
Data sheet


**Maximum rating**

Operable temperature range	T	−40/+85	°C	
Storage temperature range	T <sub>stg</sub>	−40/+85	°C	
DC voltage	V <sub>DC</sub>	0	V	
Input power				
704.00 ... 915.00 MHz	P <sub>IN</sub>	31	dBm	effective power in the on-state
1427.9 ... 1462.9 MHz	P <sub>IN</sub>	31	dBm	effective power in the on-state
1710.0 ... 2690.0 MHz	P <sub>IN</sub>	31	dBm	effective power in the on-state



**ANT - GPS/GLONASS (transfer function passband)**

**ANT - GPS/GLONASS (transfer function wideband)**


**ANT - NON (transfer function)**

**GPS - NON (isolation, transfer function)**


# SAW Components

B4340

## GPS/GLONASS Extractor Filter

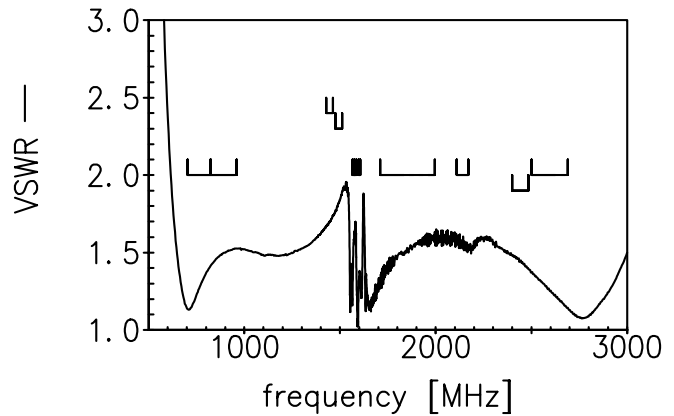
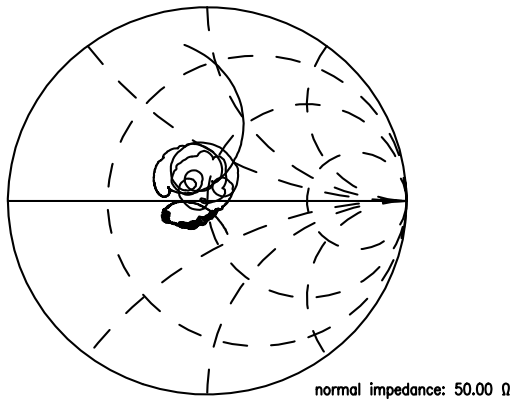
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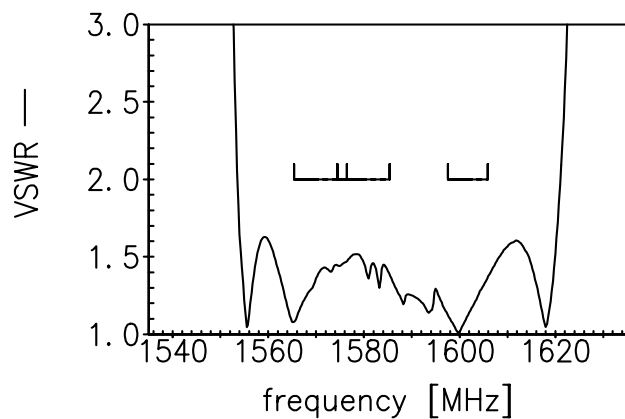
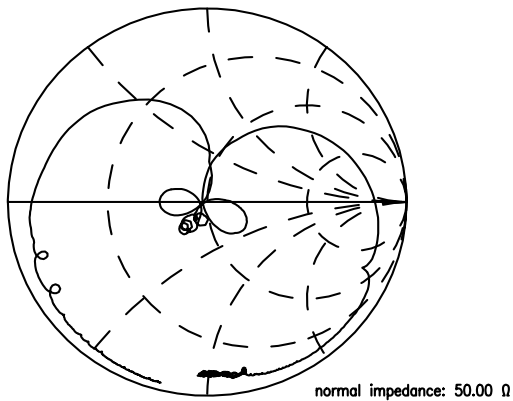


Smith chart

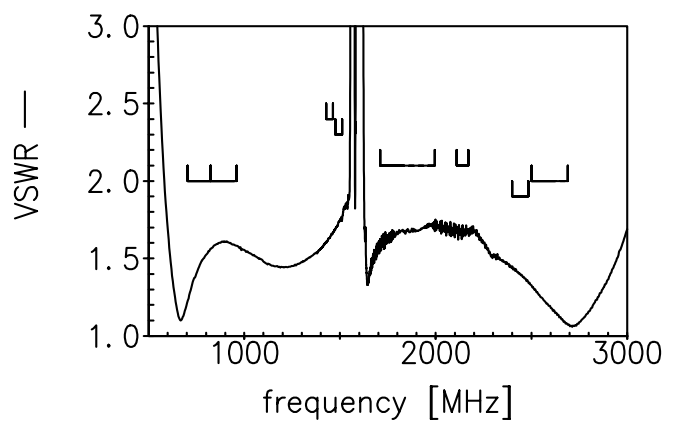
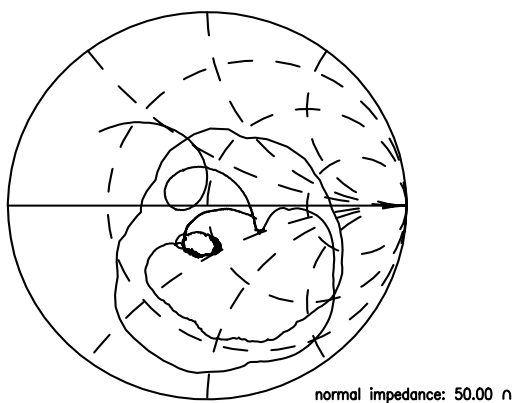
$S_{11}$  ANT



$S_{22}$  GPS/GLONASS



$S_{33}$  NON



### ESD protection of SAW filters

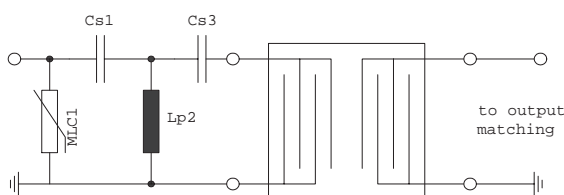
SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

In general, “ESD matching” has to be ensured at that filter port, where electrostatic discharge is expected.

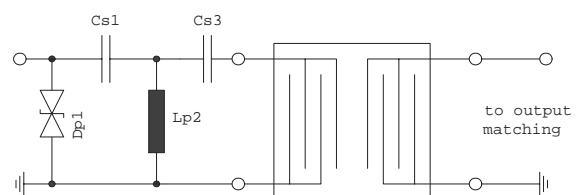
Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

Below three figures show recommended “ESD matching” topologies.

For wideband filters the high-pass ESD matching structure needs to be at least of 3<sup>rd</sup> 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.

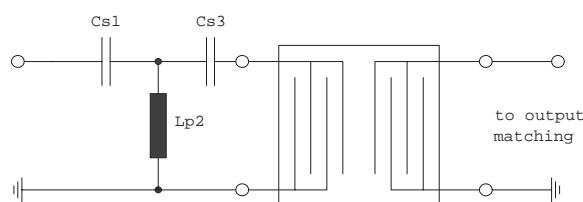


**Fig. 1 MLC varistor plus ESD matching**



**Fig. 2 Suppressor diode plus ESD matching**

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



**Fig. 3 3<sup>rd</sup> 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](http://www.epcos.com/rke). Click on “Applications Notes”.

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**References**

<b>Type</b>	B4340
<b>Ordering code</b>	B39162B4340P810
<b>Marking and package</b>	C61157-A8-A37
<b>Packaging</b>	F61074-V8247-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B4340_NB_UN.s3p, B4340_WB_UN.s3p See file header for port/pin assignment.
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	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 <sup>th</sup> , 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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<b>Matching coils</b>	See Inductor pdf-catalog <a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a> and Data Library for circuit simulation <a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a> for a large variety of matching coils.

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