

SAW Components

SAW filter

GPS / GALILEO / GLONASS

Series/type:	B3401
Ordering code:	B39162B3401B710
Date:	March 25, 2014
Version:	2.1

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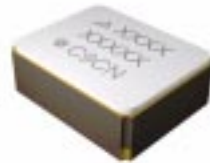
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Data sheet



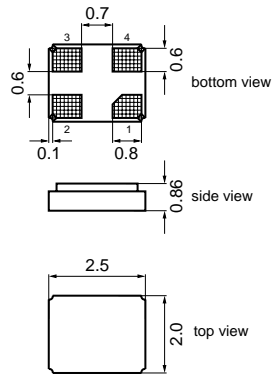
Application

- Low-loss RF filter for GPS / GALILEO / GLONASS application



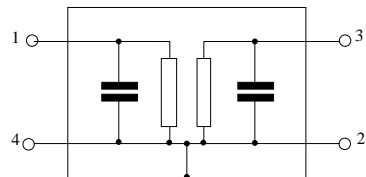
Features

- Package size 2.5 x 2.0 x 0.86 mm³
- Package code DCC4A
- RoHS compatible
- Approximate weight 0.014 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- AEC-Q200 qualified component family
- Lead free soldering compatible with J - STD20C
- Electrostatic Sensitive Device (ESD)**



Pin configuration

- 1 Input
- 3 Output
- 2,4 Case ground



SAW Components	B3401
SAW filter	1588.65 MHz

Data sheet



Characteristics

Temperature range for specification: $T = -40\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$
 Terminating load impedance: $Z_L = 50\ \Omega$

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1588.65	—	MHz
Maximum insertion attenuation	α_{max}				
1573.42 ... 1577.42 MHz		—	1.3	1.7	dB
1571.42 ... 1605.89 MHz		—	1.6	1.9	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1573.42 ... 1577.42 MHz		—	0.2	1.2	dB
1571.42 ... 1605.89 MHz		—	0.5	2.0	dB
VSWR Input					
1573.42 ... 1577.42 MHz		—	1.4	2.0	
1597.55 ... 1605.89 MHz		—	1.4	2.0	
VSWR Output					
1573.42 ... 1577.42 MHz		—	1.4	2.0	
1597.55 ... 1605.89 MHz		—	1.4	2.0	
Group delay ripple¹⁾ (p-p)	$\Delta\tau$				
1573.42 ... 1577.42 MHz		—	1.3	8	ns
1597.55 ... 1605.89 MHz		—	2.4	12	ns
Deviation within GLONASS band relative to L1 1575.42 MHz		—	2.0	—	ns
Attenuation	α				
100.00 ... 690.00 MHz		44	49	—	dB
690.00 ... 800.00 MHz		48	54	—	dB
800.00 ... 960.00 MHz		42	49	—	dB
960.00 ... 1420.00 MHz		32	36	—	dB
1420.00 ... 1500.00 MHz		26	32	—	dB
1500.00 ... 1525.00 MHz		20	27	—	dB
1625.00 ... 1660.00 MHz		1	3	—	dB
1660.00 ... 1710.00 MHz		30	36	—	dB
1710.00 ... 1850.00 MHz		27	32	—	dB
1850.00 ... 1980.00 MHz		25	30	—	dB
1980.00 ... 2570.00 MHz		20	26	—	dB

¹⁾ measured with an aperture of 2 MHz

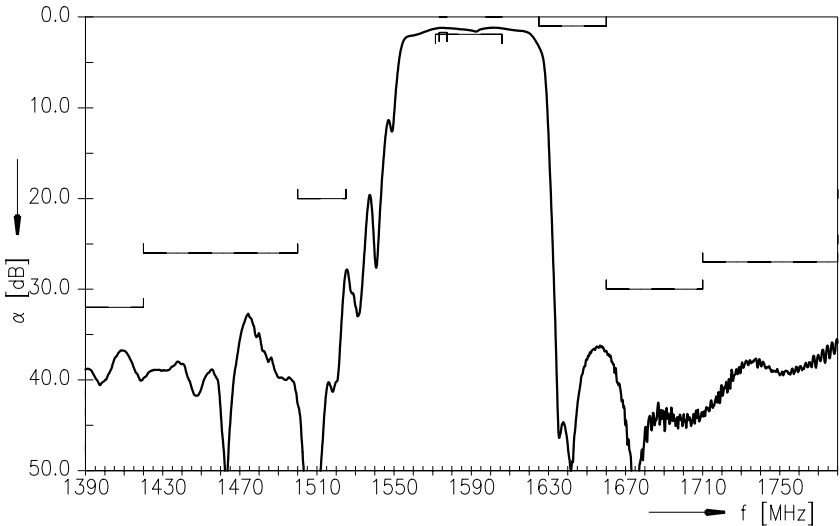

Maximum ratings

Operable temperature range	T	-45/+125	°C	source impedance 50 Ω
Storage temperature range	T _{stg}	-45/+125	°C	
DC voltage	V _{DC}	6	V	
Input power at	P _{in}			
1571.42 to 1605.89 MHz		10	dBm	
700.00 to 915.00 MHz		20	dBm	
1710.00 to 1980.00 MHz		20	dBm	

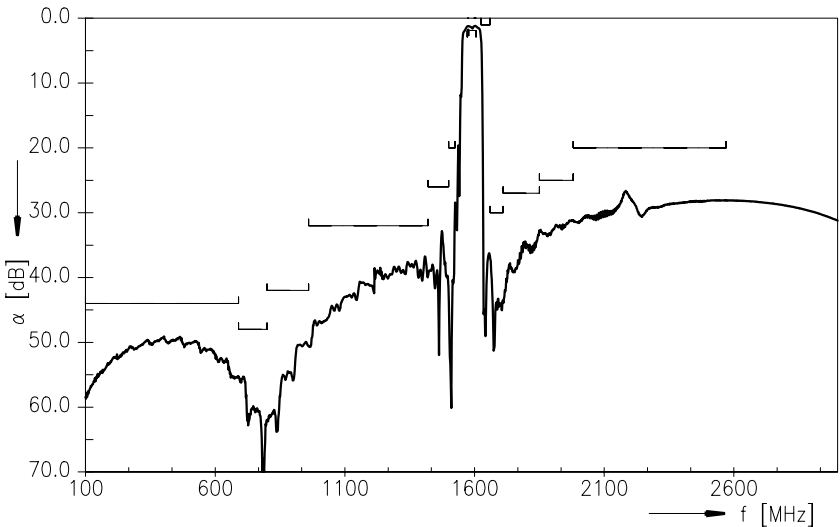
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Transfer function



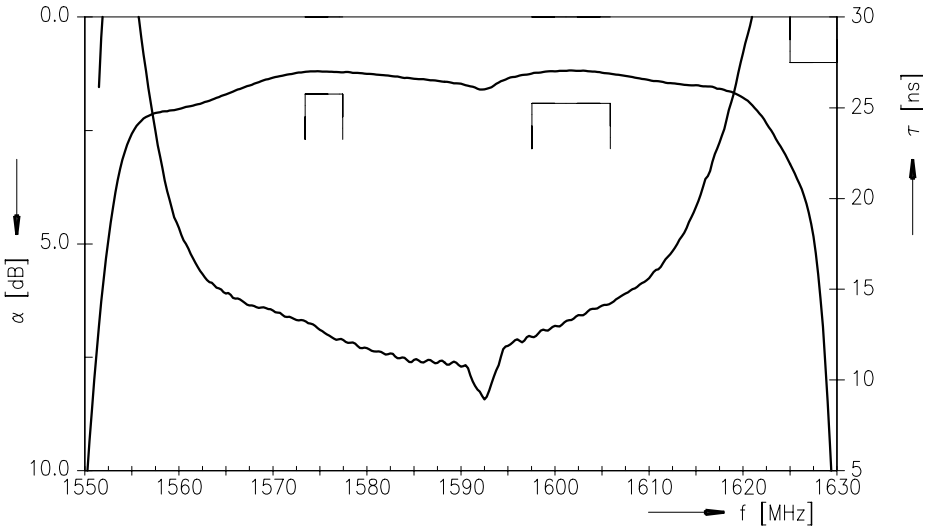
Transfer function (wideband)



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Group delay




ESD protection of SAW filters

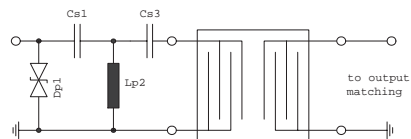
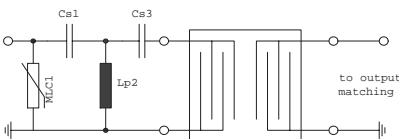
SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

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

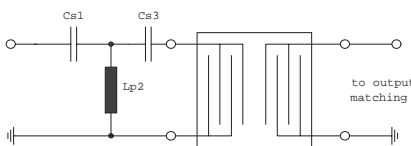
Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

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”.

SAW Components	B3401
SAW filter	1588.65 MHz

Data sheet



References

Type	B3401
Ordering code	B39162B3401B710
Marking and package	C61157-A7-A168
Packaging	F61074-V8239-Z000
Date codes	L_1126
S-parameters	B3401_NB.s2p, B3401_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 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 further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com.

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