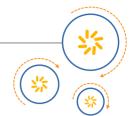


# RF360 Europe GmbH

# A Qualcomm - TDK Joint Venture



# **SAW Components**

# SAW RF filter

Automotive telematics

Series/type: B3400

Ordering code: B39162B3400U410

Date: May 22, 2014

Version: 2.3

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# **SAW Components**

# SAW RF filter

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SAW Components B3400
SAW RF filter 1575.42 MHz

Data sheet



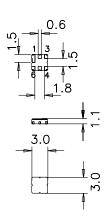
## **Application**

- Low-loss RF filter for GPS application
- Usable passband 2.046 MHz
- No matching network required for operation at 50  $\Omega$



#### **Features**

- Package size 3.0 x 3.0 x 1.1 mm<sup>3</sup>
- Package code DCC6C
- RoHS compatible
- Approximate weight 0.037 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Lead free soldering compatible with J STD20C
- AEC-Q200 qualified component family
- Electrostatic Sensitive Device (ESD)

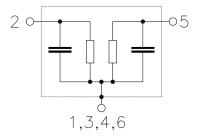


# Pin configuration

■ 2 Input

■ 5 Output

■ 1,3,4,6 Case ground





SAW Components B3400
SAW RF filter 1575.42 MHz

Data sheet

### Characteristics

Temperature range for specification:  $T = -40 \,^{\circ}\text{C}$  to  $+105 \,^{\circ}\text{C}$ 

Terminating source impedance:  $Z_S = 50 \Omega$ Terminating load impedance:  $Z_L = 50 \Omega$ 

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			min.	typ. @ 25 °C	max.	
1574.397 1576.443MHz — 2.3 3.7 1) dB  Amplitude ripple (p-p) Δα — 0.2 1.6 2) dB  Input VSWR 1574.397 1576.443MHz — 1.6 2.1 3)  Output VSWR 1574.397 1576.443MHz — 1.5 2.1 4)  Attenuation α  100.00 1200.00 MHz 52 52 59 — dB 1200.00 1465.00 MHz 40 46 — dB 1465.00 1475.42 MHz 39 47 — dB 1475.42 1540.42 MHz 24 29 — dB 1540.42 1545.42 MHz 26 43 — dB 1544.42 1555.42 MHz 10.5 23 — dB 1595.42 1605.42 MHz 10.5 26 — dB 1605.42 1675.42 MHz 23 31 — dB 1605.42 1675.42 MHz 32 38 — dB 1675.42 1710.00 MHz 46 56 — dB 1710.00 1910.00 MHz 50 58 — dB 1910.00 2000.00 MHz 37 45 — dB 2000.00 2100.00 MHz 42 51 — dB 2000.00 2100.00 MHz 42 51 — dB 2100.00 2200.00 MHz 42 51 — dB	Center frequency	f <sub>C</sub>	_		_	MHz
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1574.397 1576.443 MHz       —       1.6       2.1 3)         Output VSWR         1574.397 1576.443 MHz       —       1.5       2.1 4)         Attenuation         α       100.00 1200.00 MHz       52       59       —       dB         1200.00 1465.00 MHz       40       46       —       dB         1465.00 1475.42 MHz       39       47       —       dB         1475.42 1540.42 MHz       24       29       —       dB         1540.42 1545.42 MHz       26       43       —       dB         1595.42 1605.42 MHz       10.5       23       —       dB         1605.42 1625.42 MHz       10.5       26       —       dB         1625.42 1675.42 MHz       32       33       —       dB         1675.42 1710.00 MHz       46       56       —       dB         1710.00 1910.00 MHz       46       56       —       dB         1910.00 2000.00 MHz       37       45       —       dB         2000.00 2100.00 MHz       39       47       —       dB		Δα	_	0.2	1.6 <sup>2)</sup>	dB
Attenuation         100.00        1200.00       MHz       52       59       —       dB         1200.00        1465.00       MHz       40       46       —       dB         1465.00        1475.42       MHz       39       47       —       dB         1475.42        1540.42       MHz       24       29       —       dB         1540.42        1545.42       MHz       26       43       —       dB         1545.42        1555.42       MHz       10.5       23       —       dB         1595.42        1605.42       MHz       10.5       26       —       dB         1605.42        1625.42       MHz       23       31       —       dB         1625.42        1675.42       MHz       32       38       —       dB         1675.42        1710.00       MHz       46       56       —       dB         1710.00        1910.00       MHz       37       45       —       dB         1910.00        <	1574.397 1576.443MHz		_	1.6	2.1 <sup>3)</sup>	
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1475.42        1540.42       MHz       24       29       —       dB         1540.42        1545.42       MHz       26       43       —       dB         1545.42        1555.42       MHz       10.5       23       —       dB         1595.42        1605.42       MHz       10.5       26       —       dB         1605.42        1625.42       MHz       23       31       —       dB         1625.42        1675.42       MHz       32       38       —       dB         1675.42        1710.00       MHz       46       56       —       dB         1710.00        1910.00       MHz       50       58       —       dB         1910.00        2000.00       MHz       37       45       —       dB         2000.00        2100.00       MHz       42       51       —       dB         2100.00        2200.00       MHz       39       47       —       dB				_	_	
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1545.42 1555.42 MHz				_		-
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2000.00 2100.00 MHz					_	
2100.00 2200.00 MHz 39 47 — dB			_	_	_	
				_	_	-
2200.00 2500.00 MHz 34 42 — dB					_	-
	2200.00 2500.00 MHz		34	42	_	dB

 $<sup>^{1)}~2.7</sup>dB$  max. at 25  $^{\circ}C$  , ~3.1dB max. at -40 to +85  $^{\circ}C$ 

<sup>2) 1.0</sup>dB max. at -40 to +85 °C

<sup>3) 2.0</sup> max. at -40 to +85 °C

<sup>4) 2.0</sup> max. at -40 to +85 °C



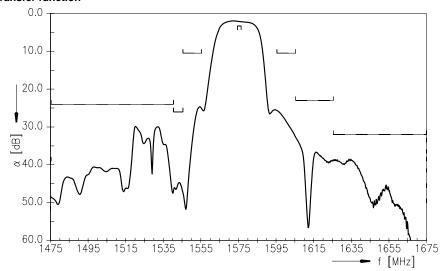
SAW Components				B3400
SAW RF filter				1575.42 MHz
Data sheet		$\equiv_{MI}$		
Maximum ratings				
Operable temperature range	Т	-45/+125	°C	
Storage temperature range	$T_{stg}$	-45/+125	°C	
DC voltage	$V_{DC}$	6	V	
Input power at	P <sub>in</sub>			source impedance 50 $\Omega$
1574.397 to 1576.443 MHz		10	dBm	
700.00 to 960.00 MHz		20	dBm	
960.00 to 1525.00 MHz		20	dBm	
1710.00 to 2170.00 MHz		20	dBm	
2400.00 to 2483.50 MHz		20	dBm	



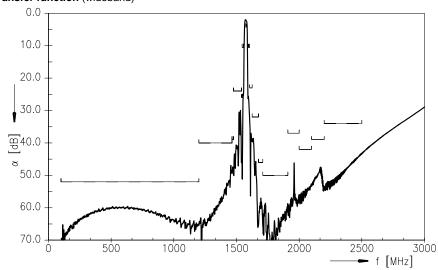
SAW Components B3400
SAW RF filter 1575.42 MHz

Data sheet = M =

### Transfer function



# Transfer function (wideband)





SAW Components B3400

SAW RF filter 1575.42 MHz

Data sheet



#### ESD protection of SAW filters

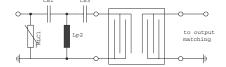
SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

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.



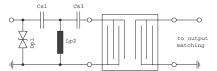


Fig. 1 MLC varistor plus ESD matching

Fig. 2 Suppressor diode plus ESD matching

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

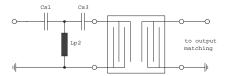


Fig. 3 3rd order high-pass structure for basic ESD protection

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	B3400
SAW RF filter	1575.42 MHz

**Data sheet** 



#### References

Туре	B3400
Ordering code	B39162B3400U410
Marking and package	C61157-A7-A67
Packaging	F61074-V8228-Z000
Date codes	L_1126
S-parameters	B3400_NB.s2p, B3400_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.

For further information please contact your local EPCOS sales office or visit our webpage at  $\underline{www.epcos.com}$ .

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