

RF360 Europe GmbH

A Qualcomm – TDK Joint Venture

## SAW Components

### SAW RF filter

Short range devices

Series/type: B3588  
Ordering code: B39921B3588U410  
Date: December 17, 2014  
Version: 2.5

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Date:	December 17, 2014
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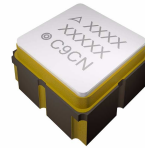
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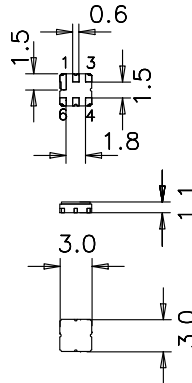
Data sheet

**Application**

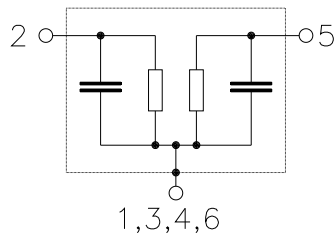
- Low-loss RF filter for remote control receivers
- No matching network required for operation at 50 Ω


**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    To be ground



Data sheet


**Characteristics**

Temperature range for specification:  $T = 0\text{ }^{\circ}\text{C to }+70\text{ }^{\circ}\text{C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$   
 Terminating load impedance:  $Z_L = 50\ \Omega$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	915.0	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	2.9	3.3	dB
902.00 ... 928.00 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.9	1.5	dB
902.00 ... 928.00 MHz					
<b>VSWR</b>		—	1.8:1	2.3:1	
<b>Relative attenuation (relative to <math>\alpha_{\max}</math>)</b>	$\alpha_{\text{rel}}$				
10.00 ... 800.00 MHz		50	55	—	dB
800.00 ... 845.00 MHz		45	50	—	dB
845.00 ... 880.00 MHz		35	43	—	dB
947.00 ... 992.00 MHz		15	22	—	dB
992.00 ... 1020.00 MHz		35	45	—	dB
1020.00 ... 1200.00 MHz		45	50	—	dB

<b>SAW Components</b>	<b>B3588</b>
<b>SAW RF filter</b>	<b>915.0 MHz</b>

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:  $Z_L = 50\ \Omega$

		<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>	
<b>Center frequency</b> $f_C$		—	915.0	—	MHz
<b>Maximum insertion attenuation</b> 902.00 ... 928.00 MHz	$\alpha_{max}$	—	2.9	3.5	dB
<b>Amplitude ripple (p-p)</b> 902.00 ... 928.00 MHz	$\Delta\alpha$	—	0.9	1.8	dB
<b>VSWR</b> 902.00 ... 928.00 MHz		—	1.8:1	2.4:1	
<b>Relative attenuation (relative to <math>\alpha_{max}</math>)</b> 10.00 ... 800.00 MHz	$\alpha_{rel}$	50	55	—	dB
800.00 ... 845.00 MHz		45	50	—	dB
845.00 ... 880.00 MHz		33	43	—	dB
947.00 ... 992.00 MHz		13	22	—	dB
992.00 ... 1020.00 MHz		35	45	—	dB
1020.00 ... 1200.00 MHz		45	50	—	dB

**Maximum ratings**

Operable temperature range	T	-45/+125	°C	
Storage temperature range	T <sub>stg</sub>	-45/+125	°C	
DC voltage	V <sub>DC</sub>	6	V	
Source power	P <sub>S</sub>	15	dBm	source impedance 50 Ω
Source power	P <sub>S</sub>	18	dBm	duty cycle 1:10,
902.00 ... 928.00 MHz				-40 °C to +85 °C

Data sheet



**ESD protection of SAW filters**

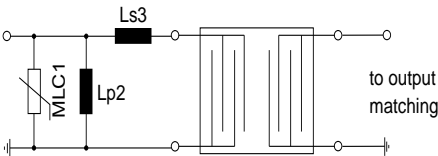
SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

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

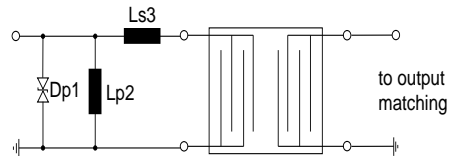
Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

Below two figures show recommended “ESD matching” topologies.

Depending on the input impedance of the SAW filter and the source impedance, the needed component values have to be determined from case to case.

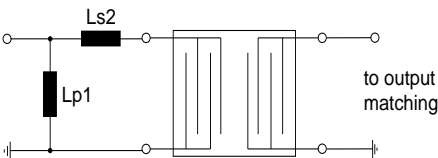


**Fig. 1 MLC varistor plus ESD matching**

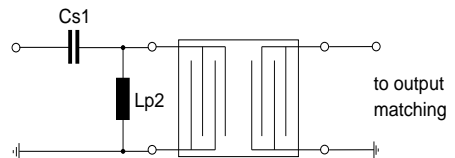


**Fig. 2 Suppressor diode plus ESD matching**

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



**Fig. 3 shunt L – series L matching**



**Fig. 4 series C – shunt L matching**

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:

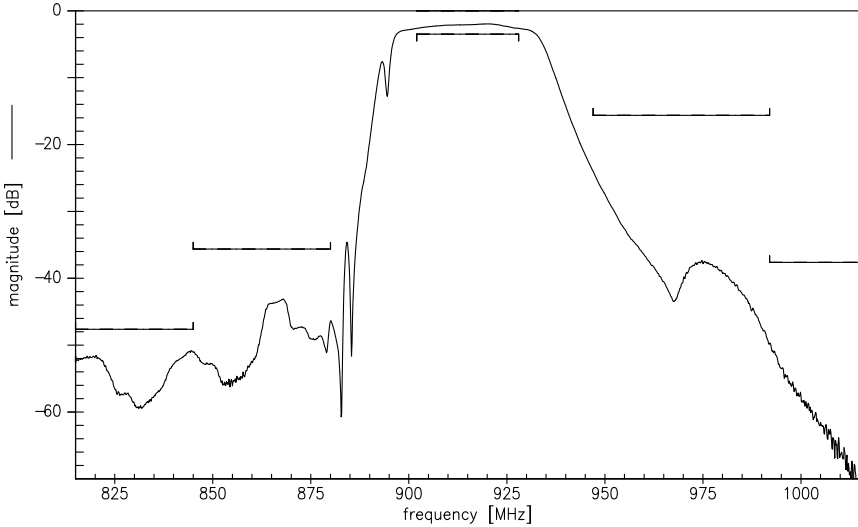
“**ESD protection for SAW filters**”. This report can be found under [www.epcos.com/rke](http://www.epcos.com/rke). Click on “data sheets” and then “Applications” under category “Further information”.



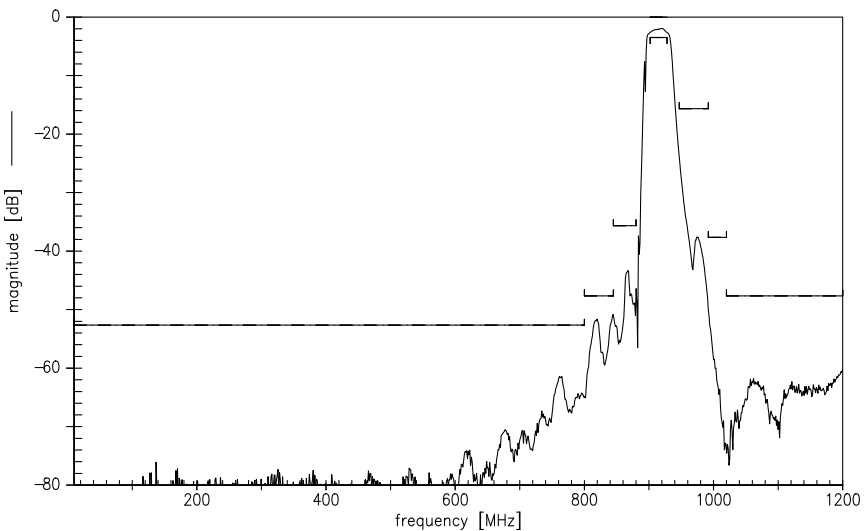
Data sheet



Transfer function (narrowband)



Transfer function (wideband)

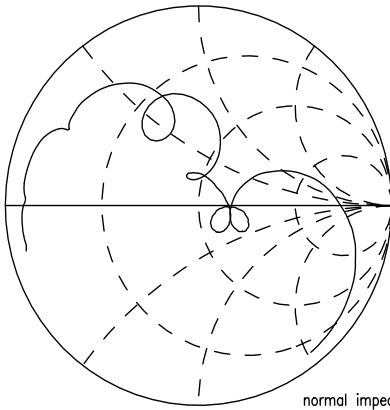


Data sheet

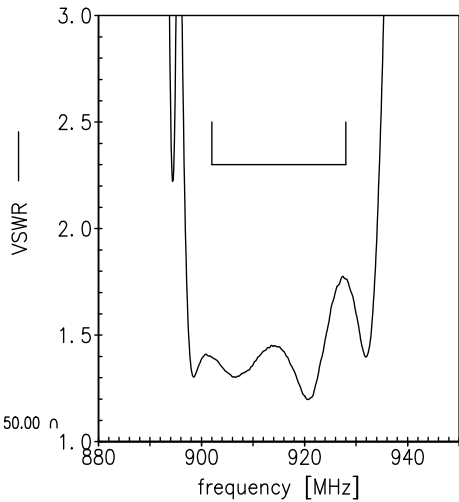


Smith charts

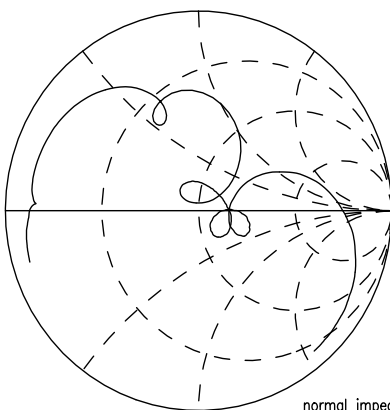
**S<sub>11</sub> function**



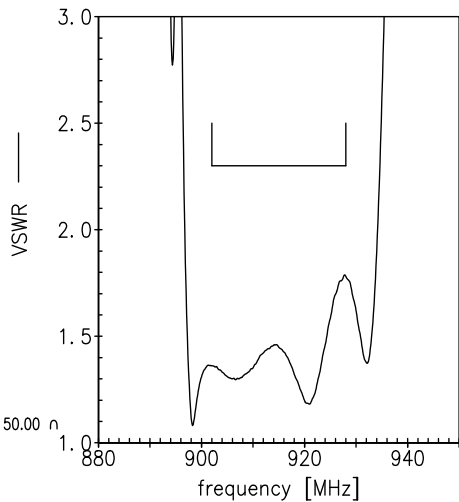
normal impedance: 50.00  $\Omega$



**S<sub>22</sub> function**



normal impedance: 50.00  $\Omega$



<b>SAW Components</b>	<b>B3588</b>
<b>SAW RF filter</b>	<b>915.0 MHz</b>

Data sheet



## References

<b>Type</b>	B3588
<b>Ordering code</b>	B39921B3588U410
<b>Marking and package</b>	C61157-A7-A67
<b>Packaging</b>	F61074-V8168-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B3588_NB.s2p, B3588_WB.s2p See file header for port/pin assignment table.
<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.
<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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