

SAW Components

SAW filter Short range devices

Series/type: Ordering code:

B3734 B39871B3734H110

Date: Version: February 04, 2013 2.3

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868.30 MHz

B3734

SAW Components

SAW filter

Data sheet

SMD

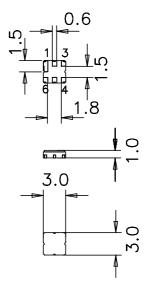
Application

- Low-loss RF filter for remote control receivers
- Balanced and unbalanced operation possible



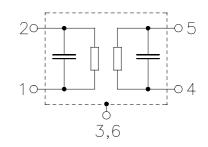
Features

- Package size 3.0 x 3.0 x 1.0 mm³
- Package code DCC6E
- RoHS compatible
- Approximate weight 0.037 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Lead free soldering compatible with J STD20C
- Passivation layer Elpas
- AEC-Q200 qualified component family
- Electrostatic Sensitive Device (ESD)



Pin configuration¹⁾

- 1 Input ground (recommended) or input
- Input (recommended) or input ground
- 4 Output (recommended) or output ground
- 5 Output ground (recommended) or output
- 3,6 to be grounded



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

February 04, 2013

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Please read *cautions and warnings and important notes* at the end of this document.

SAW Components

SAW filter

Data sheet

Characteristics

Temperature for specification:
Terminating source impedance:
Terminating load impedance:

T = 25 °C

SMD

 $Z_S = 50 \Omega$ and matching network

 $Z_1 = 50 \Omega$ and matching network

		min.	typ.	max.	
Center frequency	f _C		868.30		MHz
Minimum insertion attenuation	$\alpha_{\sf min}$				
incl. loss in matching elements $(Q_1 = 66)$		_	3.2	3.7	dB
excl. loss in matching elements			2.6	3.1	dB
Pass band (relative to α_{min})					
868.15 868.45 MHz			1.0	3.0	dB
Relative attenuation (relative to α_{min})	α_{rel}				
10.00 620.00 MHz		46	51		dB
620.00 680.00 MHz		36	41		dB
680.00 855.00 MHz		47	51		dB
855.00 864.00 MHz		32	36		dB
864.00 867.20 MHz		21	24	—	dB
867.20 867.60 MHz		11	23	—	dB
867.60 867.90 MHz			6	—	dB
869.50 876.00 MHz		12	15		dB
876.00 884.00 MHz		32	37		dB
884.00 2500.00 MHz		48	53		dB
Impedance for pass band matching ¹⁾					
Input: $Z_{IN} = R_{IN} C_{IN}$		—	430 0.8		Ω pF
Output: Z _{OUT} = R _{OUT} C _{OUT}		_	430 0.8		Ω pF

¹⁾ Impedance for passband matching bases on an ideal, perfect matching of the SAW filter to source- and to load impedance (here 50 Ohm). After removal of the SAW filter the input impedance of the input and output matching network is calculated. The conjugate complex value of these characteristic impedances are the input and output impedances for flat passband. For more details we refer to EPCOS application note #18.

3

B37<u>34</u>

868.30 MHz

SAW Components

SAW filter

Data sheet

Characteristics

Temperature range for specification:
Terminating source impedance:

Terminating load impedance:

 $T = -40 \degree C \text{ to } +105 \degree C$

 $Z_{S} = 50 \Omega$ and matching network

 $Z_L = 50 \Omega$ and matching network

		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	868.30	—	MHz
Minimum insertion attenuation	α _{min}				
incl. loss in matching elements $(Q_1 = 66)$		_	3.2	3.9	dB
excl. loss in matching elements		_	2.6	3.3	dB
Pass band (relative to α_{\min})					
868.15 868.45 MHz		_	1.0	3.0	dB
Relative attenuation (relative to α_{min})	α_{rel}				
10.00 620.00 MHz	Ter	46	51	_	dB
620.00 680.00 MHz		36	41		dB
680.00 855.00 MHz		47	51		dB
855.00 864.00 MHz		32	36		dB
864.00 867.20 MHz		21	24		dB
867.20 867.60 MHz		3	10	—	dB
869.50 876.00 MHz		12	15	_	dB
876.00 884.00 MHz		32	37		dB
884.00 2500.00 MHz		48	53	—	dB
Impedance for pass band matching ¹)					
Input: $Z_{IN} = R_{IN} C_{IN}$		_	430 0.8	_	Ω pF
Output: $Z_{OUT} = R_{OUT} C_{OUT}$		_	430 0.8		Ω pF

<u>SMD</u>

¹⁾ Impedance for passband matching bases on an ideal, perfect matching of the SAW filter to source- and to load impedance (here 50 Ohm). After removal of the SAW filter the input impedance of the input and output matching network is calculated. The conjugate complex value of these characteristic impedances are the input and output impedances for flat passband. For more details we refer to EPCOS application note #18.



B3734

868.30 MHz



868.30 MHz

B3734

SAW Components

SAW filter

Data sheet

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Maximum ratings

Operable temperature range	Т	-45/+125	°C	
Storage temperature range	T _{stg}	-45/+125	°C	
DC voltage	V _{DC}	6	V	
Source power	P_S	10	dBm	source impedance 50 Ω



868.30 MHz

B3734

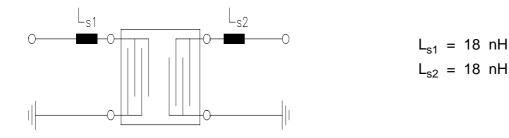
SAW Components

SAW filter

Data sheet

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Matching network to 50 Ω (element values depend on pcb layout and equivalent circuit)



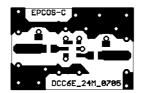
Minimising the crosstalk

For a good ultimate rejection a low crosstalk is necessary. Low crosstalk can be realised with a good RF layout. The major crosstalk mechanism is caused by the "ground-loop" problem.

Grounding loops are created if input-and output transducer GND are connected on the top-side of the PCB and fed to the system grounding plane by a common via hole. To avoid the common ground path, the ground pin of the input- and output transducer are fed to the system ground plane (bottom PCB plane) by their own via hole. The transducers' grounding pins should be isolated from the upper grounding plane.

A common GND inductivity of 0.5nH degrades the ultimate rejection (crosstalk) by 20dB.

The optimised PCB layout, including matching network for transformation to 50 Ohm, is shown here. In this PCB layout the grounding loops are minimised to realise good ultimate rejection



Optimised PCB layout for SAW filters in DCC6E package, pinning 2,4 (top side, scale 1:1)

The bottom side is a copper plane (system ground area). The input and output grounding pins are isolated and connected to the common ground by separated via holes.

For good contact of the upper grounding area with the lower side it is necessary to place enough via holes.



868.30 MHz

B3734

SAW Components

SAW filter

Data sheet

ESD protection of SAW filters

SAW filters are Electro Static Discharge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

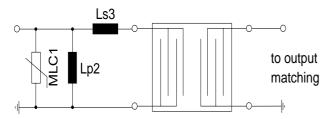
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In general, "ESD matching" has to be ensured at that filter port, where electrostatic discharge is expected.

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.



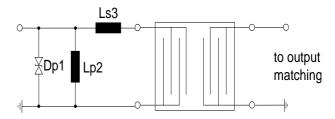
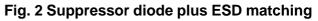
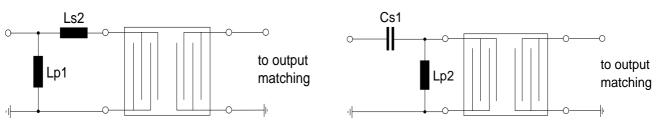
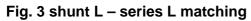


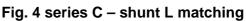
Fig. 1 MLC varistor plus ESD matching



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







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 <u>www.epcos.com/rke</u>. Click on "data sheets" and then "Applications" under category "Further information".



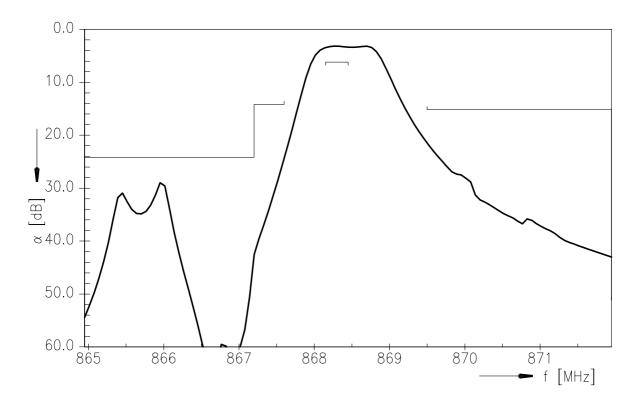
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SAW filter	868.30 MHz

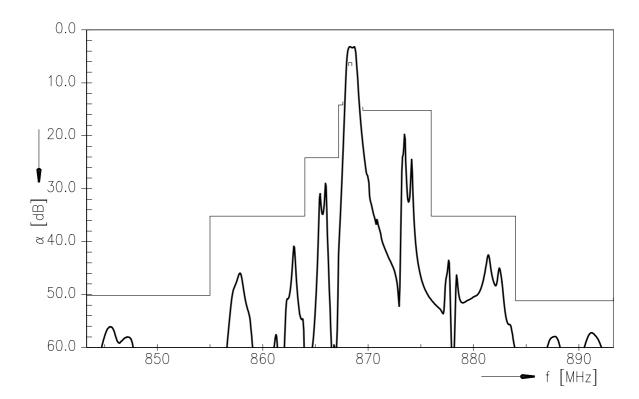
Data sheet

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Transfer function



Transfer function (wideband)



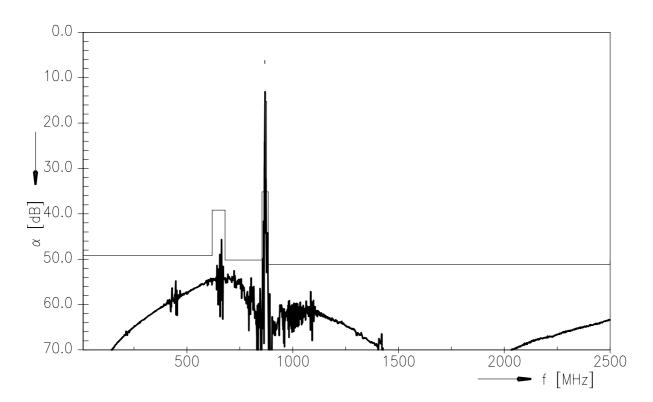
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SAW filter	868.30 MHz
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Data sheet

SMD

Transfer function (ultimate rejection)



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Data sheet

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References

Туре	B3734
Ordering code	B39871B3734H110
Marking and package	C61157-A7-A143
Packaging	F61074-V8168-Z000
Date codes	L_1126
S-parameters	B3734_SB.s2p B3734_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.
Matching coils	See Inductor pdf-catalog <u>http://www.tdk.co.jp/tefe02/coil.htm#aname1</u> and Data Library for circuit simulation <u>http://www.tdk.co.jp/etvcl/index.htm</u>

For further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com.

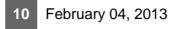
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