SAW Components

SAW RF filter

Short range devices

Series/type:	**B3728**
Ordering code:	**B39921B3728U410**
Date:	February 02, 2012
Version:	2.1

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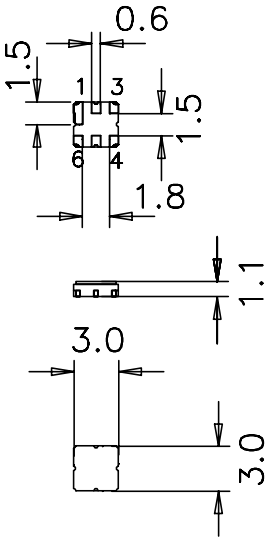
Application

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

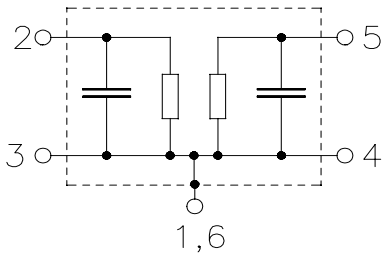
Features

- Package size 3.0 x 3.0 x 1.1 mm³
- Package code DCC6C
- RoHS compatible
- Approximate weight 0.037 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- Lead free soldering compatible with J - STD20C
- AEC-Q200 qualified component family
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

- 2 Input
- 5 Output
- 1,3,4,6 Ground



Characteristics

Reference temperature for specification: T = +25 °C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 50 Ω

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	915.00	—	MHz
Maximum insertion attenuation	α_{max}				
902.00 ... 928.00 MHz		—	2.2	2.6	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
902.00 ... 928.00 MHz		—	1.4	1.8	dB
VSWR					
Input 902.00 ... 928.00 MHz		—	1.7	2.0	
Output 902.00 ... 928.00 MHz		—	1.8	2.0	
Attenuation					
10.00 ... 800.00 MHz		35	38	—	dB
800.00 ... 888.00 MHz		39	41	—	dB
888.00 ... 890.00 MHz		35	40	—	dB
890.00 ... 894.00 MHz		15	22	—	dB
940.00 ... 941.00 MHz		45	53	—	dB
941.00 ... 967.00 MHz		50	52	—	dB
967.00 ... 1350.00 MHz		40	42	—	dB
1350.00 ... 1600.00 MHz		35	37	—	dB
1600.00 ... 2000.00 MHz		30	33	—	dB
2000.00 ... 2500.00 MHz		28	31	—	dB

Characteristics

Temperature range for specification: T = –25 °C to +75 °C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 50 Ω

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	915.00	—	MHz
Maximum insertion attenuation	α_{max}				
902.00 ... 928.00 MHz		—	2.2	3.6	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
902.00 ... 928.00 MHz		—	1.4	2.8	dB
VSWR					
Input 902.00 ... 928.00 MHz		—	1.7	2.0	
Output 902.00 ... 928.00 MHz		—	1.8	2.0	
Attenuation					
10.00 ... 800.00 MHz		35	38	—	dB
800.00 ... 888.00 MHz		37	41	—	dB
888.00 ... 890.00 MHz		26	40	—	dB
890.00 ... 894.00 MHz		6	22	—	dB
940.00 ... 941.00 MHz		31	53	—	dB
941.00 ... 967.00 MHz		40	52	—	dB
967.00 ... 1350.00 MHz		38	42	—	dB
1350.00 ... 1600.00 MHz		35	37	—	dB
1600.00 ... 2000.00 MHz		30	33	—	dB
2000.00 ... 2500.00 MHz		28	31	—	dB

Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 50 Ω

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	915.00	—	MHz
Maximum insertion attenuation	α_{max}				
902.00 ... 928.00 MHz		—	2.2	4.0	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
902.00 ... 928.00 MHz		—	1.4	3.2	dB
VSWR					
Input 902.00 ... 928.00 MHz		—	1.7	2.0	
Output 902.00 ... 928.00 MHz		—	1.8	2.0	
Attenuation					
10.00 ... 800.00 MHz		35	38	—	dB
800.00 ... 888.00 MHz		36	41	—	dB
888.00 ... 890.00 MHz		26	40	—	dB
890.00 ... 894.00 MHz		5	22	—	dB
940.00 ... 941.00 MHz		27	53	—	dB
941.00 ... 967.00 MHz		35	52	—	dB
967.00 ... 1350.00 MHz		38	42	—	dB
1350.00 ... 1600.00 MHz		35	37	—	dB
1600.00 ... 2000.00 MHz		30	33	—	dB
2000.00 ... 2500.00 MHz		28	31	—	dB

Maximum ratings

Operable temperature range	T	–45/+125	˚C	
Storage temperature range	T_{stg}	–45/+125	˚C	
DC voltage	V_{DC}	5	V	
Source power	P_S	15	dBm	source impedance 50 Ω
Source power 902 MHz to 928 MHz	P_S	18	dBm	duty cycle 1:10, –40 ˚C to +85 ˚C

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.

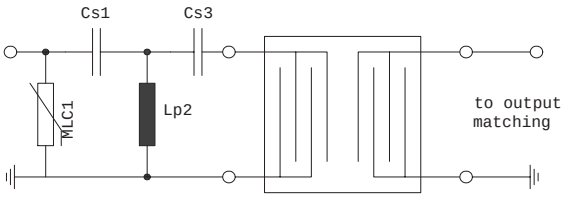


Fig. 1 MLC varistor plus ESD matching

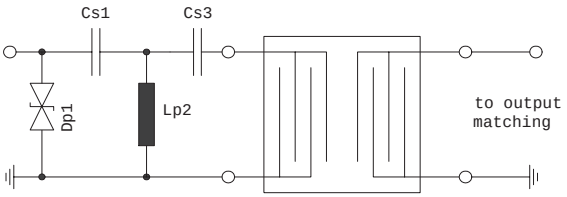


Fig. 2 Suppressor diode plus ESD matching

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

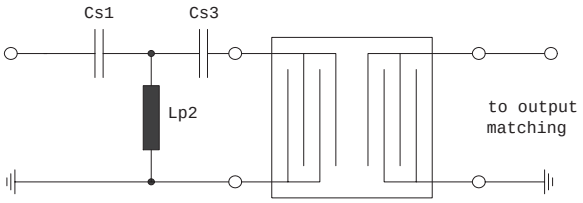


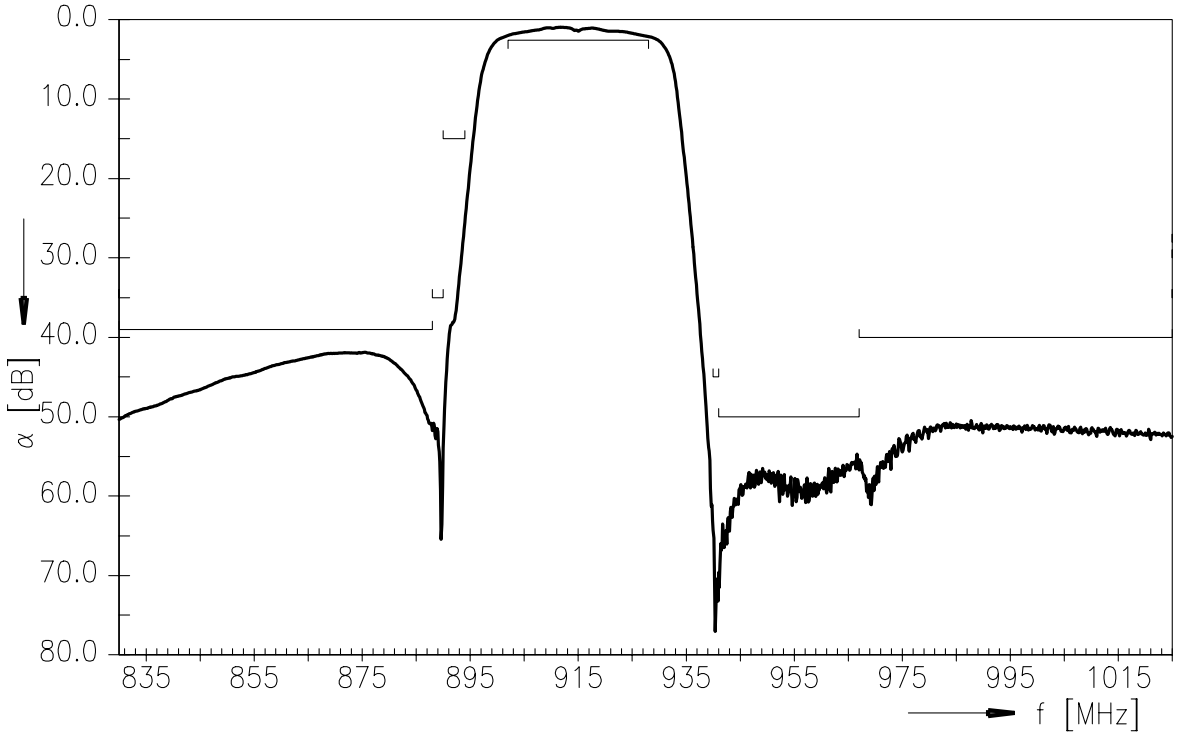
Fig. 3 3rd order high-pass structure for basic ESD protection

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.

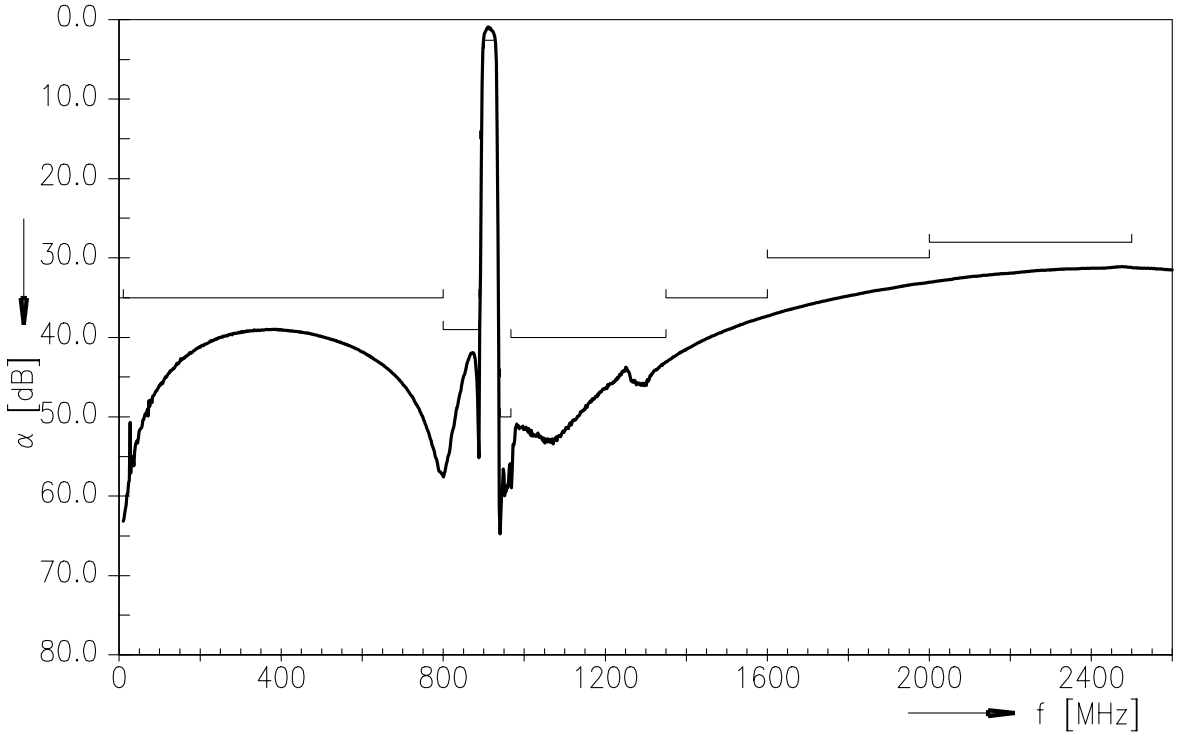
Effectiveness of the applied ESD protection has to be checked according to relevant industry standards or customer specific requirements

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”.

Transfer function



Transfer function (wideband)



References

Type	B3728
Ordering code	B39921B3728U410
Marking and package	C61157-A7-A67
Packaging	F61074-V8168-Z000
Date codes	L_1126
S-parameters	B3728_NB.s2p, B3728_WB.s2p see file header for port/pin assignment table
Soldering profile	S_6001
RoHS compatible	defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
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

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