1. General

The filter is symmetrical, i.e. input and output are exchangeable with each other.
The filter shall be driven single ended. If it is intended to the filter in an balanced environment this can be supported as well. Please contact us for details.

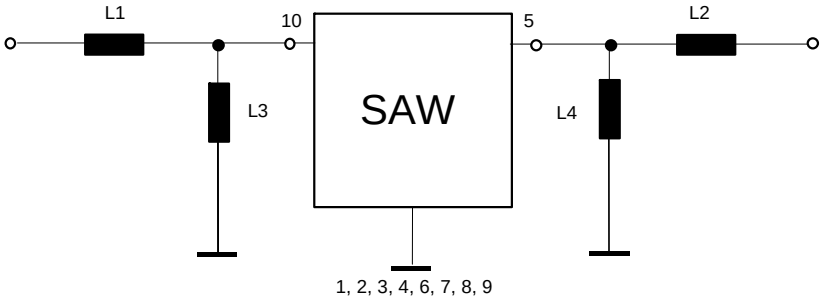
The terminating impedances are : **1100 Ω || - 5.1 pF** for the input
1100 Ω || - 5.2 pF for the output

This impedance is equal for the input and the output. It has to be realized at the point were the filter is mounted. To match this impedance to the impedance of the system a matching circuit is required.
The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to contact our design team.

2. Theoretical matching

The values of the matching elements which are given below are calculated from the terminating impedances. Because these are theoretical values they have to be modified on PCB's corresponding to the existing parasitics.

50 Ohm test circuit



L1 = L2 = 164 nH
L3 = L4 = 180 nH

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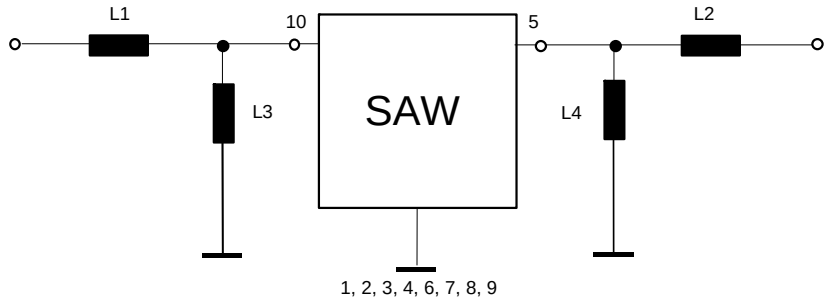
3. Matching on PCB

The theoretical matching was done without consideration of parasitics. The elements which have to be used on the PCB are slightly different from the stated above.

For example: PCB "tft028" with 50 Ω test circuit



L1 = L2 = 150 nH
L3 = L4 = 120 nH
All other components are 0 Ω jumpers.

Matching differs slightly between input and output. As long as the resulting difference in termination impedance is low this is an usable way to keep the number of matching elements as low as possible.

If the parasitics on the customer board (mentioned parasitics, additional parasitics of active parts) are different to this PCB the matching elements have to be slightly adjusted. Both in line and shunt elements change both pass band tilt and pass band ripple.

The strategy to match the filter on the customers board should be as follows:

- match the filter according to theoretical values to 50 Ohm.
  Use your final PCB for this matching to be sure to have the stray elements of the PCB then before.
- Adjust matching at filter input and filter output
  Check VSWR for filter input and output.
- Carry out the matching for the actual source and load impedance in three steps.
  Steps one and two are matching of the filter for input or output to source or load impedance respectively. The result of the matching of the filter input to the actual source can be checked via the VSWR at the filter output which is still matched to 50 Ohms and vice versa.
  The third step is the matching of the filter input to the actual source and the filter output to the actual load.

In case of questions please contact us to

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