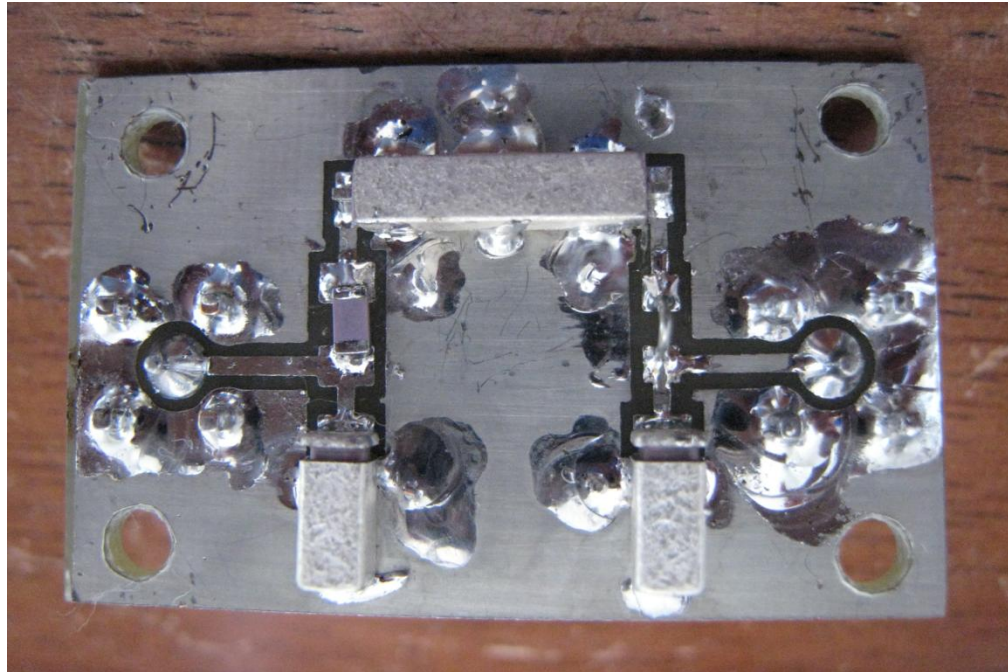


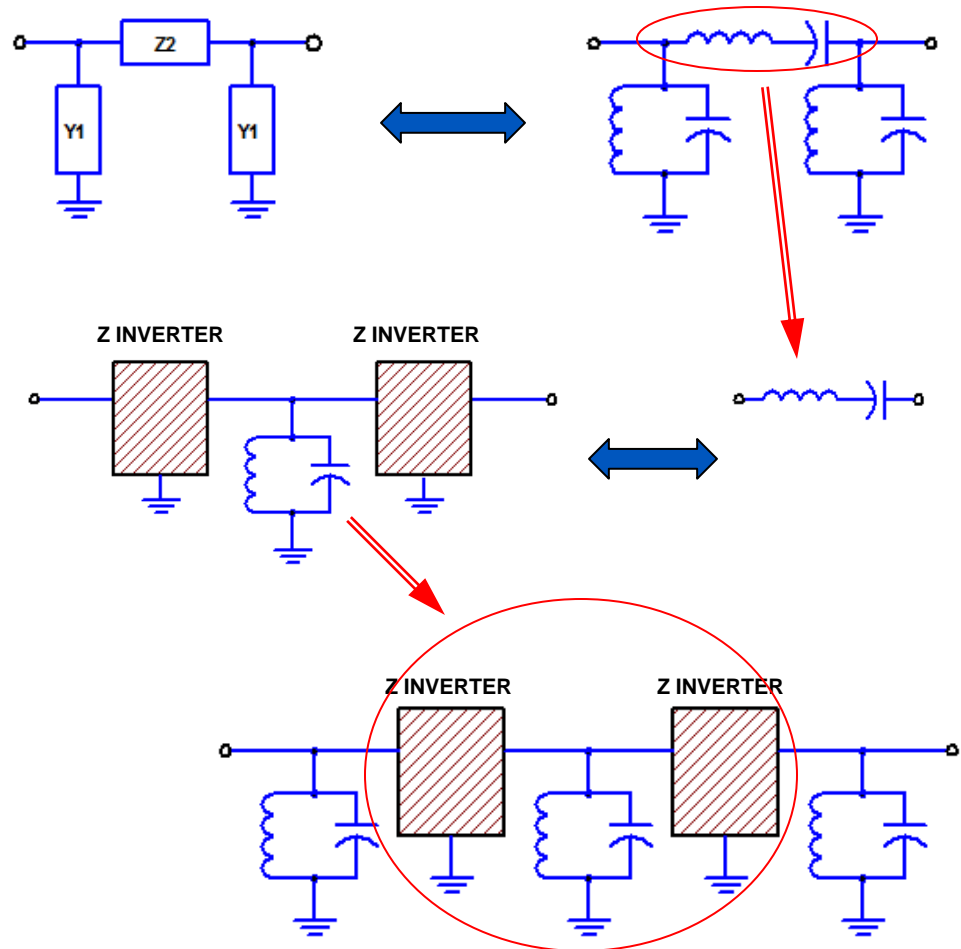
CERAMIC RESONATOR FILTERS



K5TRA

THREE RESONATOR (6th ORDER BP) FILTERS

- The canonic BP ladder is alternating series resonators and shunt resonators (6th order shown).
- Impedance inverters can provide series resonator equivalent from parallel resonator
- This Z-inverter approach provides a path to realization of BP filters from only shunt resonators



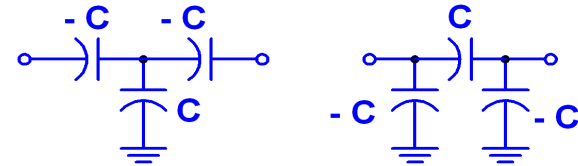
IMPEDANCE INVERTERS

IMPEDANCE (OR ADMITANCE) INVERTERS CAN BE USED TO CONVERT PARALLEL RESONANCE TO A SERIES RESONANCE CHARACTERISTIC.

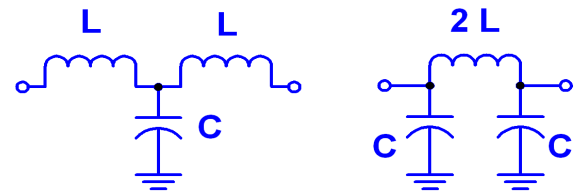
- The canonic impedance inverter is the $\lambda/4$ line.
- LC forms provide moderate bandwidth Z inversion.
- Capacitive T and π sections are for narrow band applications. Negative C is absorbed into resonator (cancels some positive C).



$$Z_0, \quad \theta = \frac{\lambda}{4}$$



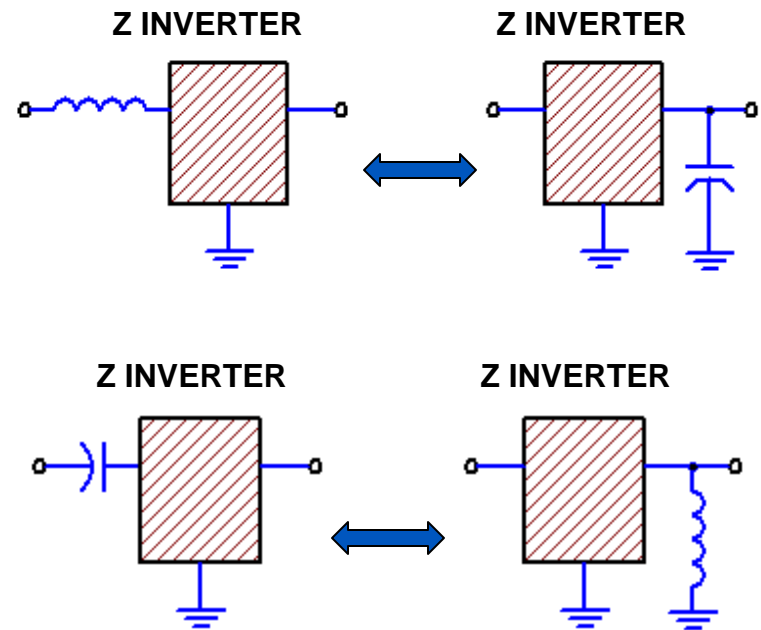
$$Z_0 = \frac{1}{\omega_0 C}$$



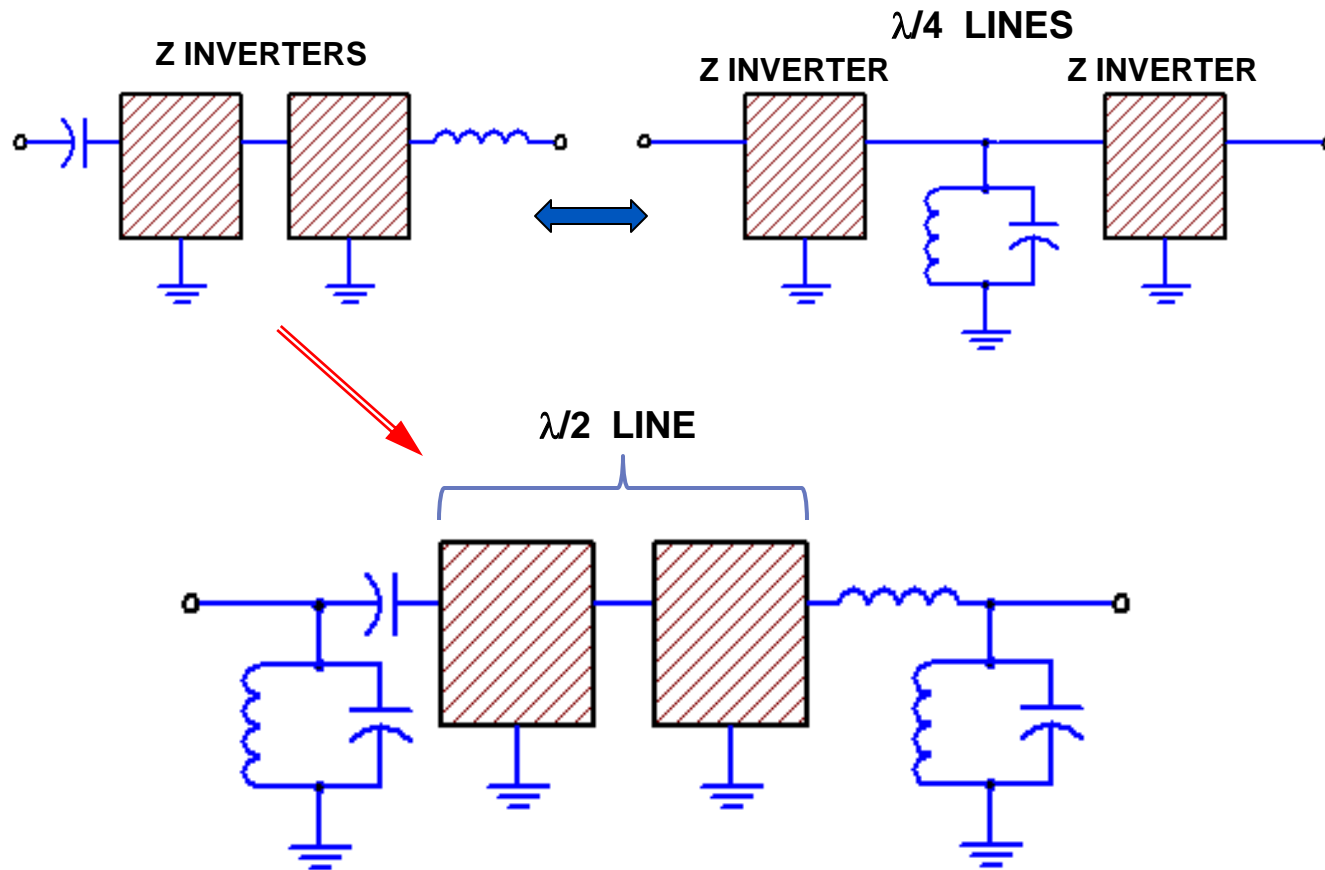
$$Z_0 = \sqrt{\frac{2L}{C}}, \quad \omega_0 = \frac{1}{\sqrt{2LC}}$$

TRANSFORMATION OF SINGLE L OR C

- Impedance inverters transform a series reactance to look like a shunt element of the opposite type.
- A series inductor transforms to a shunt capacitor.
- A series capacitor transforms to a shunt inductor.

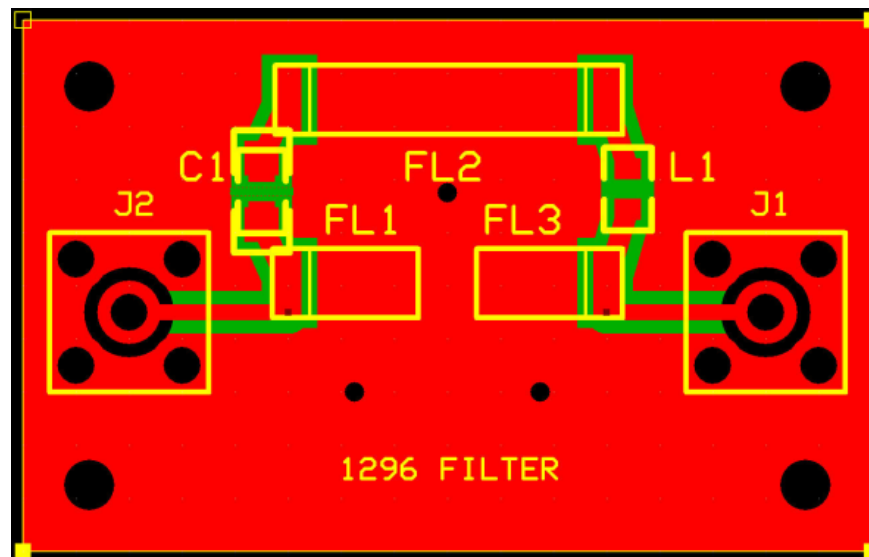
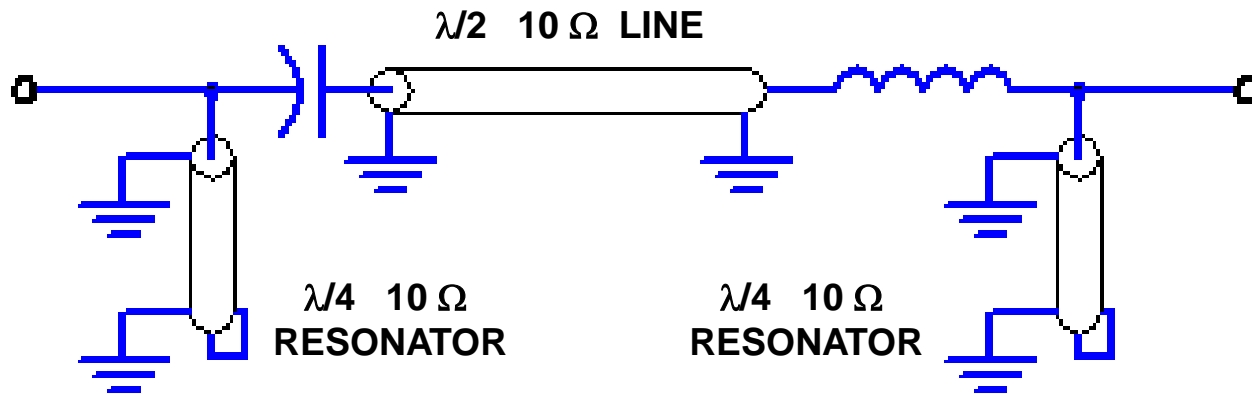


ALTERNATE 6th ORDER BP FILTER FORM



TOPOLOGY USED IN 1296 MHz FILTER

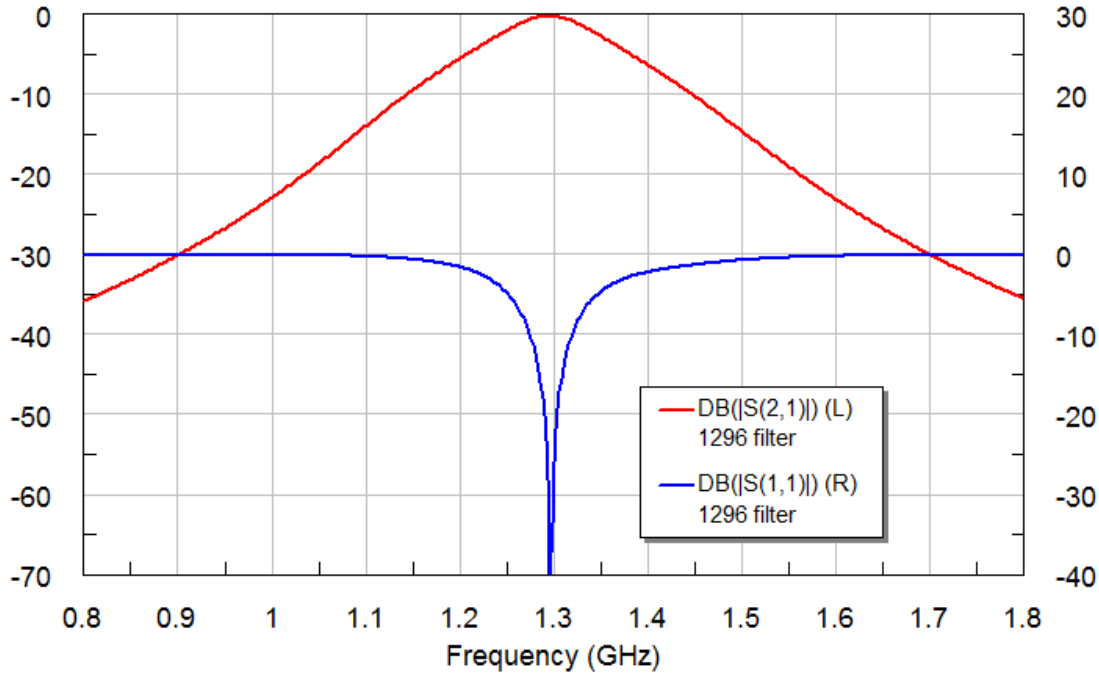
CERAMIC COAXIAL RESONATOR FILTER



VER 2.0 LAYOUT

1296 MHz FILTER RESPONSE

Loss and Match



Reflection

