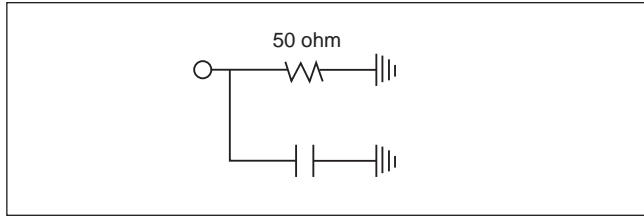


APPLICATION NOTES

50 OHM CHIP RESISTOR TERMINATION NARROW BAND MATCHING

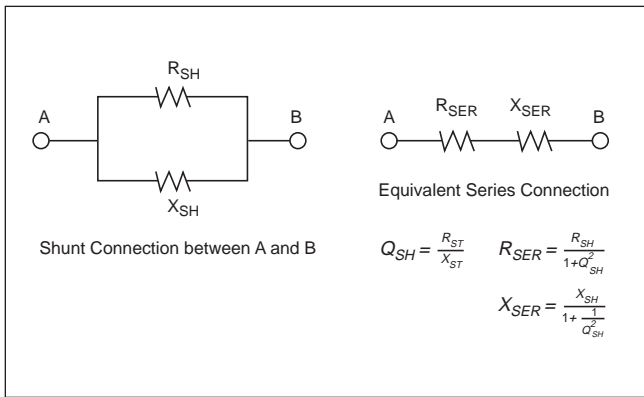
Thin substrate chip resistive terminations have a small capacitance to ground in parallel with the 50 ohm resistor.

The equivalent circuit is:



For best match over a narrowband, transform the capacitance "C" in parallel with 50 ohm to the equivalent series circuit as follows:

Shunt to Series Transformation



Once the equivalent series connection is known, the X_{SER} element (which is capacitive) may be matched out with a series inductor at the center of the band interest.

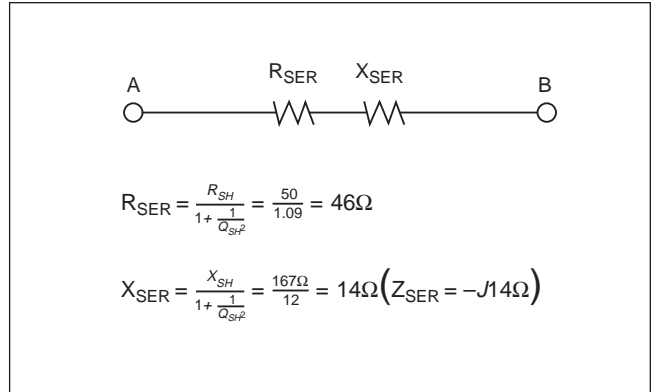
For example, KDI Chip XXX 50 ohm termination has C = 0.5 pf and is fabricated on a 25 mil thick alumina substrate.

To match out "C" at 1.9 GHz with a series inductor transform to series equivalents:

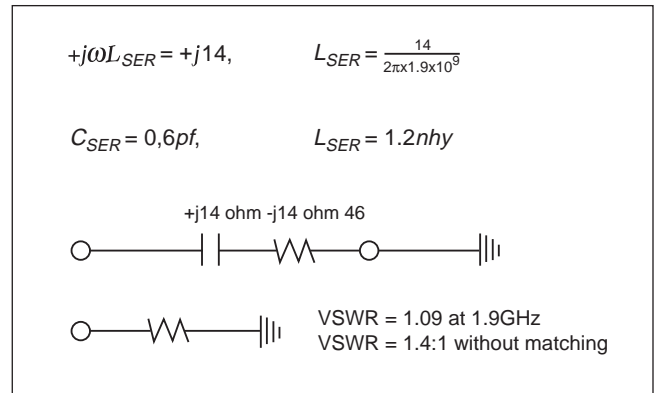
$$Q_{SH} = \frac{50}{X_{SH}}, \quad X_{SH} = \frac{1}{2\pi \times 1.9 \times 10^9 \times 0.5 \times 10^{-12}}$$

$$Q_{SH} = \frac{50}{167} = 0.3, \quad X_{SH} = 167\Omega$$

$$Q_{SH}^2 = 0.09, \quad \frac{1}{Q_{SH}^2} = 11$$



To match out -j14 ohm at 1-9 GHz requires an inductor such that



Note: This result implies that since 50 ohm is the desired final resistance, the specified original R_{SH} should have been 54 ohm.