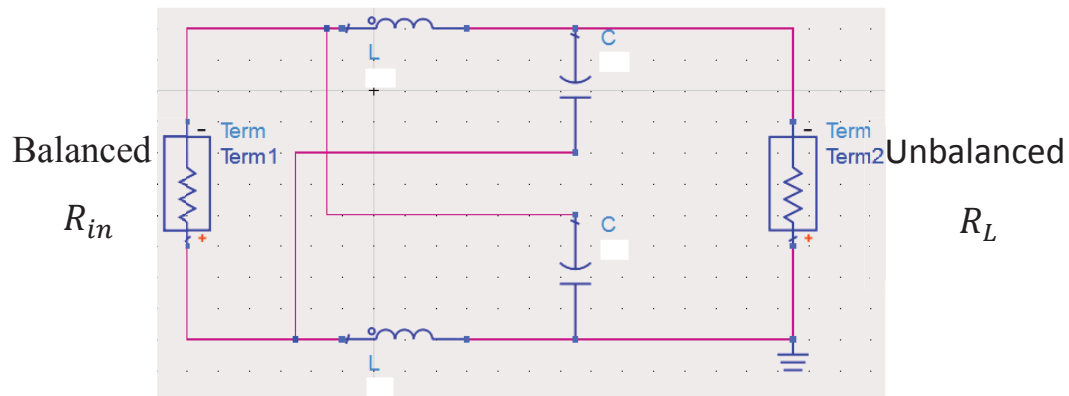




from the differential ended 66 Ohm to the single ended 50 Ohm using a lumped LC Balun.

The Theory behind the Lumped LC Balun

A lumped LC Balun is realized using lumped components, two inductors and two capacitors which are shown in the following diagram.



The characteristic impedance (Z_0) of the lumped LC Balun is given by

$$Z_0 = \sqrt{\frac{L}{C}} = \sqrt{R_{in}R_L}$$

Design Steps:

1. Know your operation frequency f_0
2. Find the impedance of reactive elements using the equation $X = \sqrt{R_{in}R_L}$
3. Compute the values of inductor and capacitor. $L = \frac{X}{2\pi f_0}$ and $C = \frac{1}{X2\pi f_0}$

Matching from the Differential Ended 66 Ohm to the Single Ended 50 Ohm

1. The CC2538 RF center operating frequency is 2.45Ghz.
2. $X = \sqrt{R_{in}R_L} = \sqrt{66 * 50} = 57.44562647 \text{ Ohm}$
3. $L = \frac{X}{2\pi f_0} = \frac{57.44562647}{2*\pi*(2.45*10^9)} = 3.731736902 * 10^{-9} \text{ H} \approx 3.732 \text{ nH}$