SPICE Model – 0402DF

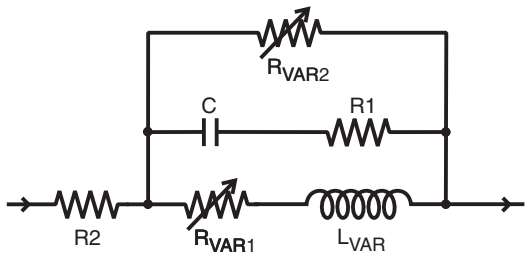
This lumped-element (SPICE) model data simulates the frequency-dependent behavior of Coilcraft power inductors within the frequency range shown in the accompanying table for each individual inductor.

The data represents de-embedded measurements, as described below. Effects due to different customer circuit board traces, board materials, ground planes or interactions with other components are not included and can have a significant effect when comparing the simulation to measurements of the inductors using other production verification instruments and fixtures.

Lumped Element Modeling Method

Measurements were made using a 50 Ohm impedance analyzer. Fixture compensation was performed to remove fixture effects. No DC bias current was applied in any of the measurements. The lumped element values were determined by optimizing the simulation model to an average of the measurements. This method results in a model that represents as closely as possible the typical frequency-dependent behavior of the component within the model frequency range.

The equivalent lumped element model schematic is shown below. Each model should only be analyzed at the input and output ports. Individual elements of the model are not determined by parameter measurement. The elements are determined by the overall performance of the lumped element model compared to the measurements taken of the component.



The value of the frequency-dependent variable resistor R_{VAR1} is calculated from:

$$R_{VAR1} = k1 \times \sqrt{f}$$

- k1 is shown for each value in the accompanying table.
- f is the frequency in Hz
- R_{VAR1} is the resistance in Ohms

The value of the frequency-dependent variable resistor R_{VAR2} is calculated from:

$$R_{VAR2} = k2 \times \sqrt{f}$$

- k2 is shown for each value in the accompanying table.
- f is the frequency in Hz
- R_{VAR2} is the resistance in Ohms

Note: The log function in the following equation is the natural logarithm, base e, not base 10.

The value of the frequency-dependent inductance L_{VAR} is calculated from:

$$L_{VAR} = k3 - k4 \times LOG\ (k5 \times f)$$

- k3, k4, and k5 are shown in the accompanying table.
- f is the frequency in Hz
- L_{VAR} is the inductance in µH
- LOG is the natural LOG (basee)

Disclaimer

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SPICE Model for Coilcraft 0402DF RF Inductors

	Frequency limit of model (MHz)					L_{VAR} Coefficients				
Part number	Lower	Upper	R1 (Ω)	R2 (Ω)	C (pF)	k1	k2	k3	k4	k5
0402DF-200	1	3000	285	0.049	10.0	2.13E-05	0.093	0.0218	6.48E-04	1.56E-06
0402DF-360	1	3000	506	0.055	2.9	1.26E-04	0.063	0.039	9.00E-04	1.56E-06
0402DF-560	1	3000	530	0.061	0.069	2.27E-06	0.017	0.060	1.15E-03	7.74E-06
0402DF-770	1	3000	432	0.072	0.080	2.27E-06	0.025	0.090	2.91E-03	1.14E-05
0402DF-900	1	3000	1670	0.079	0.083	7.12E-05	0.037	0.099	3.12E-03	1.56E-06
0402DF-101	1	3000	1050	0.104	0.052	1.07E-04	0.047	0.106	1.21E-03	1.56E-06
0402DF-121	1	3000	278	0.090	0.048	1.03E-04	0.039	0.135	1.79E-03	6.44E-05
0402DF-141	1	3000	520	0.141	0.067	1.16E-04	0.066	0.160	3.57E-03	9.83E-06
0402DF-151	1	3000	840	0.130	0.049	2.02E-04	0.048	0.171	4.76E-03	2.20E-06
0402DF-181	1	3000	1010	0.172	0.040	3.13E-05	0.063	0.213	7.70E-03	9.86E-06
0402DF-221	1	3000	846	0.240	0.041	1.93E-04	0.075	0.265	9.14E-03	3.55E-06
0402DF-271	1	3000	773	0.265	0.028	8.06E-05	0.079	0.278	3.72E-04	4.41E-01
0402DF-301	1	3000	985	0.340	0.033	9.96E-05	0.106	0.316	2.19E-03	9.83E-06
0402DF-331	1	3000	632	0.435	0.032	2.84E-04	0.110	0.341	4.76E-03	3.38E-06
0402DF-361	1	3000	1290	0.475	0.028	3.09E-04	0.166	0.375	1.09E-03	9.83E-06
0402DF-421	1	3000	546	0.510	0.029	2.45E-04	0.141	0.436	4.11E-03	3.38E-06
0402DF-471	1	3000	1750	0.670	0.024	1.00E-04	0.141	0.484	1.36E-03	9.83E-06
0402DF-531	1	3000	352	0.715	0.034	2.70E-04	0.173	0.612	1.08E-02	2.06E-06
0402DF-591	1	3000	133	0.780	0.032	2.23E-04	0.220	0.676	1.60E-02	1.33E-06
0402DF-701	1	3000	636	1.30	0.029	5.00E-05	0.255	0.720	1.26E-03	9.83E-06
0402DF-771	1	3000	86	1.35	0.039	1.44E-04	0.281	0.830	2.10E-02	5.80E-07
0402DF-901	1	3000	88	1.50	0.032	1.75E-04	0.255	0.987	1.90E-02	1.09E-06
0402DF-102	1	450	43	1.05	0.317	6.96E-05	0.510	1.000	1.26E-03	9.83E-06
0402DF-222	1	450	3.4	1.80	0.990	2.21E-05	0.950	2.300	1.40E-02	9.83E-06
0402DF-332	1	100	57	2.20	0.895	1.59E-06	2.00	3.33	1.60E-02	2.92E-06

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