SPICE Model – XFL2010

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:

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

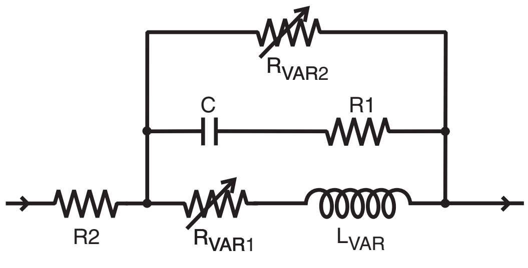
- k2 is shown for each value in the accompanying table.
- f is the frequency in Hz
- R_{VAR2} is the resistance in Ohms

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 (base e)



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www.coilcraft.com

US +1-847-639-6400 sales@coilcraft.com
UK +44-1236-730595 sales@coilcraft-europe.com
Taiwan +886-2-2264 3646 sales@coilcraft.com.tw
China +86-21-6218 8074 sales@coilcraft.com.cn
Singapore + 65-6484 8412 sales@coilcraft.com.sg

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SPICE Model for Coilcraft XFL2010 Power Inductors

Part number	Frequency limit of model (MHz) Lower	Upper	R1 (Ω)	R2 (Ω)	C (pF)	L_{VAR} Coefficients k1	k2	k3	k4	k5
XFL2010-400	0.1	2000	9.9	0.016	0.001	2.27E-6	0.003	0.04	1.08E-4	1.00E-6
XFL2010-121	0.1	2000	20	0.022	0.6	1.00E-6	0.012	0.12	1.00E-6	1.00E-6
XFL2010-221	0.1	1000	8	0.025	0.87	1.00E-6	0.025	0.22	1.00E-6	1.00E-6
XFL2010-381	0.1	1000	13	0.033	1	1.00E-6	0.052	0.38	1.00E-6	1.00E-6
XFL2010-601	0.1	1000	17	0.054	1.1	1.00E-6	0.09	0.6	1.00E-6	1.00E-6
XFL2010-821	0.1	1000	17	0.061	1.2	1.00E-6	0.1	0.82	1.00E-6	1.00E-6
XFL2010-102	0.1	500	20	0.083	1.4	1.00E-6	0.16	1	1.00E-6	1.00E-6
XFL2010-152	0.1	500	10	0.115	1.3	1.00E-6	0.26	1.5	1.00E-6	1.00E-6
XFL2010-222	0.1	500	14	0.156	1.3	1.00E-6	0.37	2.2	1.00E-6	1.00E-6
XFL2010-332	0.1	500	9	0.213	1.82	1.00E-6	0.55	3.3	3.09E-2	1.00E-6
XFL2010-472	0.1	500	13	0.32	1.6	1.00E-6	0.77	4.7	1.00E-6	1.00E-6
XFL2010-682	0.1	500	12	0.405	1.8	1.00E-6	1	6.8	1.00E-6	1.00E-6
XFL2010-822	0.1	500	15	0.511	1.9	1.00E-6	1.3	8.2	1.00E-6	1.00E-6
XFL2010-103	0.1	100	22	0.595	1.9	1.00E-6	1.7	10	1.00E-6	1.00E-6
XFL2010-183	0.1	100	40	1.17	1.7	1.00E-6	3.1	18	1.00E-6	1.00E-6
XFL2010-223	0.1	50	95	1.5	2	1.00E-6	3.7	22	1.00E-6	1.00E-6
XFL2010-333	0.1	50	90	2.14	1.9	1.00E-6	5.5	33	1.00E-6	1.00E-6
XFL2010-473	0.1	50	43	2.91	2.1	1.00E-6	8.5	47	1.00E-6	1.00E-6
XFL2010-563	0.1	50	30	3.66	2.2	1.00E-6	12.6	56	1.00E-6	1.00E-6
XFL2010-683	0.1	50	44	3.98	2.2	1.00E-6	16.1	68	1.00E-6	1.00E-6
XFL2010-823	0.1	50	36	5.81	1.9	1.00E-6	20.5	82	1.00E-6	1.00E-6
XFL2010-104	0.1	50	63	6.98	2.4	1.00E-6	27.3	100	1.00E-6	1.00E-6
XFL2010-224	0.1	50	46	13.66	2.4	1.00E-6	78.3	220	1.00E-6	1.00E-6

US +1-847-639-6400 sales@coilcraft.com
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Taiwan +886-2-2264 3646 sales@coilcraft.com.tw
China +86-21-6218 8074 sales@coilcraft.com.cn
Singapore + 65-6484 8412 sales@coilcraft.com.sg

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