SPICE Model – DO1813H/-HC

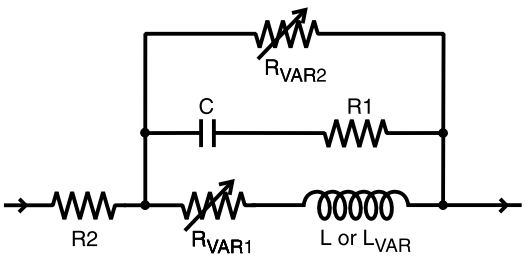
This lumped-element (SPICE) model data simulates the frequency-dependent behavior of Coilcraft power inductors within the frequency range shown in the accompanying table for each individual inductor.

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 be analyzed only at the input and output ports. Conclusions based on individual lumped element values may be erroneous.



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

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

- 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:

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

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

For some part numbers, two models are provided: one using a variable inductance element (L_{VAR}) and the other using a fixed inductance value (L). Chose the one whose frequency range best suits your application.

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:

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

- 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)

Disclaimer

Coilcraft makes every attempt to provide accurate measurement data and software, representative of our components, in a usable format. Coilcraft, however, disclaims all warrants relating to the use of its data and software, whether expressed or implied, including without limitation any implied warranties of merchantability or fitness for a particular purpose. Coilcraft cannot and will not be liable for any special, incidental, consequential, indirect or similar damages occurring with the use of the data and/or software.

1102 Silver Lake Road Cary, Illinois 60013 **Phone** 847/639-6400 **Fax** 847/639-1469
E-mail info@coilcraft.com **Web** http://www.coilcraft.com

SPICE Model for Coilcraft DO1813H/-HC Power Inductors

Part number	Frequency limit of model (MHz) Lower	Upper	R1 (Ω)	R2 (Ω)	C (pF)	k1	k2	L_{VAR} Coefficients k3	k4	k5	L (µH)
DO1813P-181H	0.1	4.4	472	0.001	835	1.73E-05	0.115	0.180	2.85E-03	9.38E-06	
DO1813P-181H	4.4	10	400	0.001	20.0	1.61E-05	0.076				0.169
DO1813P-331H	0.1	4.4	50000	0.004	14.0	4.85E-05	0.146	0.330	7.96E-03	1.02E-05	
DO1813P-331H	4.4	10	697	0.004	20.6	3.30E-05	0.137				0.298
DO1813P-561H	0.1	4.4	57500	0.003	8.02	8.05E-05	0.354	0.560	9.59E-03	9.38E-06	
DO1813P-561H	4.4	10	0.370	0.004	7.30	8.20E-05	0.354				0.523
DO1813P-122H	0.1	4.4	58800	0.001	7.17	1.85E-04	0.679	1.15	2.30E-02	9.92E-06	
DO1813P-122H	4.4	10	0	0.002	6.73	1.71E-04	0.638				1.06
DO1813P-222H	0.1	4.4	63000	0.001	1.51	3.48E-04	1.33	2.06	3.49E-02	1.03E-05	
DO1813P-222H	4.4	10	2.00	0.001	3.71	3.44E-04	1.28				1.92
DO1813P-332H	0.1	4.4	500000	0.040	1.95	6.67E-04	1.42	3.20	5.18E-02	8.98E-06	
DO1813P-332H	4.4	10	0.850	0.037	2.43	2.85E-04	1.05				2.99
DO1813P-472H	0.1	4.4	21400	0.001	2.16	9.00E-03	2.29	4.70	1.29E-01	1.00E-05	
DO1813P-472H	4.4	10	0	0.050	2.02	1.21E-03	2.58				4.20
DO1813P-682H	0.1	3.5	21400	0.001	2.16	1.03E-03	3.07	6.80	1.65E-01	1.00E-05	
DO1813P-682H	3.5	10	0	0.001	2.50	1.21E-03	2.99				6.18
DO1813P-103H	0.1	1	1030	0.001	0.944	6.53E-04	0.963	9.55	3.43E-01	9.40E-06	
DO1813P-103H	1	3.5	20000	0.001	1.82	3.35E-03	6.89	8.74	3.65E-01	9.80E-07	
DO1813P-103H	3.5	10	0	0.001	2.59	3.35E-03	5.63				8.24
DO1813P-153H	0.1	1	366	0.001	0.777	8.66E-04	1.76	15.3	3.73E-01	8.62E-06	
DO1813P-153H	1	3.5	0	3.08	0.970	7.52E-04	4.71	15.5	4.44E-01	8.78E-06	
DO1813P-153H	3.5	10	0	5.16	2.14	1.92E-03	7.83				13.8
DO1813P-223H	0.1	1	366	0.001	0.777	5.76E-04	2.47	22.6	4.33E-01	8.62E-06	
DO1813P-223H	1	3.5	366	3.91	0.777	4.10E-04	4.93	22.6	5.05E-01	7.12E-06	
DO1813P-153H	3.5	10	0	13.7	1.54	8.12E-04	9.00				20.8
DO1813P-333H	0.1	2.5	379	0.253	0.00	2.94E-04	6.26	32.5	4.76E-01	9.52E-06	
DO1813P-333H	2.5	10	100	13.6	2.11	2.00E-04	14.0				30.4
DO1813P-473H	0.1	2	100	0.264	0.00	1.56E-04	7.88	48.1	4.69E-01	9.06E-06	
DO1813P-473H	2	10	1.00	12.7	2.10	1.46E-04	13.2				45.9

1102 Silver Lake Road Cary, Illinois 60013 **Phone** 847/639-6400 **Fax** 847/639-1469
E-mail info@coilcraft.com **Web** http://www.coilcraft.com