SPICE Model – DO3316P

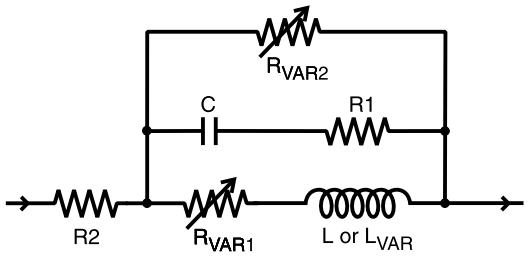
This lumped-element (SPICE) model data simulates the frequency-dependent behavior of Coilcraft power inductors within the frequency range shown in the accompanying table for each individual inductor.

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:

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

- 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

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

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.

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

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SPICE Model for Coilcraft DO3316P 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)
DO3316P-102	0.1	1	498000	0.031	262	2.00E-05	0.318	1.00	2.12E-02	4.00E-06	
DO3316P-102	1	10	25600	0.054	524	4.00E-05	0.519				0.97
DO3316P-152	0.1	1	2290	0.052	275	5.03E-05	0.677	1.48	3.48E-02	6.20E-06	
DO3316P-152	1	10	25500	0.113	0.66	2.92E-05	0.743				1.42
DO3316P-222	0.1	1	9300	0.051	12.0	5.43E-05	0.610	2.17	5.94E-02	5.74E-06	
DO3316P-222	1	10	6700	0.223	2.63	1.80E-05	1.22				2.07
DO3316P-332	0.1	1	6420	0.090	2.00	1.68E-04	0.764	3.30	1.03E-01	9.73E-06	
DO3316P-332	1	10	3170	0.433	0.915	3.65E-05	1.35				3.06
DO3316P-472	0.1	1	7300	0.084	2.00	2.26E-04	1.07	4.70	1.32E-01	9.85E-06	
DO3316P-472	1	10	828	0.670	3.83	2.09E-05	2.31				4.39
DO3316P-682	0.1	1	11200	0.207	2.00	2.80E-04	1.04	6.80	2.19E-01	9.76E-06	
DO3316P-682	1	10	1	1.34	3.24	2.13E-05	2.74				6.29
DO3316P-103	0.1	1	16000	0.001	0.64	9.30E-04	1.55	10.0	3.91E-01	9.55E-06	
DO3316P-103	1	10	803	2.31	3.32	2.15E-05	4.65				9.08
DO3316P-153	0.1	1	29200	0.001	2.00	1.84E-03	2.76	15.0	6.79E-01	9.90E-06	
DO3316P-153	1	10	218	3.04	3.68	1.90E-05	5.23				13.4
DO3316P-223	0.1	1	5400	0.001	23.1	2.53E-03	3.09	22.0	1.12E+00	9.55E-06	
DO3316P-223	1	10	1	6.26	3.34	4.85E-05	6.59				19.6
DO3316P-333	0.1	1	50	0.001	2.00	1.84E-03	3.17	33.0	1.44E+00	9.60E-06	
DO3316P-333	1	10	1	7.77	4.29	5.98E-05	9.33				29.6
DO3316P-473	0.1	1	50	0.134	2.00	4.28E-03	3.71	47.0	2.62E+00	9.60E-06	
DO3316P-473	1	9	1	15.1	3.99	1.00E-04	10.5				40.5
DO3316P-683	0.1	1	1000	0.027	7.80	4.27E-03	5.62	68.0	3.62E+00	9.65E-06	
DO3316P-683	1	7	1	21.8	4.47	4.52E-05	16.2				59.9
DO3316P-104	0.1	1	1890	0.005	0.01	3.37E-03	7.77	100	3.53E+00	8.90E-06	
DO3316P-104	1	6	1	31.3	4.36	6.20E-05	22.8				90.1
DO3316P-154	0.1	1	3230	0.010	0.01	1.79E-03	6.76	149	6.50E+00	9.12E-06	
DO3316P-154	1	5	1	81.7	3.35	8.89E-05	29.0				130
DO3316P-224	0.1	1	3230	0.010	0.01	1.79E-03	10.9	219	6.05E+00	9.12E-06	
DO3316P-224	1	3	1	99.0	4.17	4.32E-04	30.5				196
DO3316P-334	0.1	1	3790	0.007	0.024	1.09E-03	16.5	330	5.55E+00	8.80E-06	
DO3316P-334	1	3	1	113	4.19	4.07E-04	30.8				299
DO3316P-474	0.1	0.5	1	0.016	0.001	6.69E-03	34.4	470	1.80E+00	1.13E-05	
DO3316P-474	1	2.2	1	17.4	4.58	8.14E-04	40.5				457
DO3316P-684	0.1	1.5	1	3.44	3.31	1.30E-03	55.7				680
DO3316P-105	0.1	1.5	1	4.43	5.19	2.60E-03	99.0				998

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