SPICE Model – DT1608

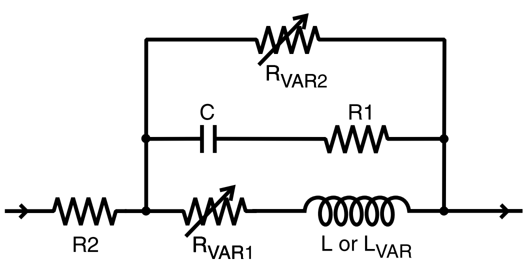
This lumped-element (SPICE) model data simulates the frequency-dependent behavior of Coilcraft power inductors within the frequency range shown in the accompanying table for each individual inductor.

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.

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

Disclaimer

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SPICE Model for Coilcraft DT1608 Power Inductors

	Frequency limit of model (MHz)							L_{VAR} Coefficients			
Part number	Lower	Upper	R1 (Ω)	R2 (Ω)	C (pF)	k1	k2	k3	k4	k5	L (µH)
DT1608C-222	0.1	0.5	1000	0.086	0.000	0.00E+00	0.802				2.20
DT1608C-222	0.5	10	3150	0.000	53.9	1.57E-07	0.406	2.20	3.64E-02	1.94E-06	
DT1608C-332	0.1	0.5	1000	0.067	0.000	0.00E+00	1.60				3.30
DT1608C-332	0.5	1.5	645	0.002	313	5.55E-08	1.35	3.30	7.73E-02	2.65E-06	
DT1608C-332	1.5	10	1580	0.000	53.9	2.28E-06	0.523	3.25	1.42E-01	7.50E-07	
DT1608C-472	0.1	0.4	11500	0.165	24.7	2.67E-09	1.65				4.70
DT1608C-472	0.4	1	7540	0.000	105	2.01E-09	0.766				4.70
DT1608C-472	1	10	3160	0.000	59.2	8.45E-07	0.800	4.60	1.15E-01	4.90E-07	
DT1608C-682	0.1	0.3	5790	0.076	4.77	3.69E-09	2.92				6.80
DT1608C-682	0.3	1	2050	0.001	1760	3.97E-07	3.04				6.80
DT1608C-682	1	10	4530	0.000	136	7.78E-06	1.65	6.80	1.04E-01	1.09E-06	6.80
DT1608C-103	0.1	0.6	6050	0.782	5.72	3.83E-09	2.60				10.0
DT1608C-103	0.6	1	13400	0.253	22.8	4.00E-09	1.56				10.0
DT1608C-103	1	10	4050	0.000	168	1.98E-05	1.91	10.0	1.92E-01	1.04E-06	10.0
DT1608C-153	0.1	0.5	4640	0.625	2.27	3.19E-09	5.68				15.0
DT1608C-153	0.5	1	7990	0.200	41.2	1.80E-08	3.78				15.0
DT1608C-153	1	10	7020	0.000	21.6	1.04E-05	3.13	15.0	1.73E-01	1.32E-06	
DT1608C-223	0.1	0.5	5240	0.813	1.91	1.02E-04	7.30				22.0
DT1608C-223	0.5	1	10500	0.000	41.5	3.87E-07	4.47				22.0
DT1608C-223	1	4.7	9660	0.000	40.0	9.40E-06	4.57	22.0	2.62E-01	1.07E-06	
DT1608C-223	4.7	10	0.135	9.99	1.30	4.99E-07	2.57				21.1
DT1608C-333	0.1	0.4	0.008	0.887	0.000	1.01E-05	15.4				33.0
DT1608C-333	0.4	3.4	12100	0.000	27.5	2.43E-05	8.05	33.0	1.24E-01	5.62E-06	
DT1608C-333	3.4	10	1140	15.4	1.37	4.18E-05	4.66				32.1
DT1608C-473	0.1	0.4	0.010	0.783	0.000	2.06E-06	20.5				47.0
DT1608C-473	0.4	2	15400	0.000	23.1	1.04E-05	15.2				46.8
DT1608C-473	2	10	731	0.000	1.27	1.20E-04	6.58				46.8
DT1608C-683	0.1	0.4	0.013	0.709	0.000	2.54E-06	27.5				68.0
DT1608C-683	0.4	2	12400	0.006	26.1	1.22E-09	31.9				67.5
DT1608C-683	2	10	0.000	0.276	1.30	2.70E-05	7.19				67.6
DT1608C-104	0.1	0.5	0.001	1.11	7.70	2.64E-06	61.4				100
DT1608C-104	0.5	2	16300	0.067	8.03	4.10E-05	58.2				100
DT1608C-104	2	10	1620	0.000	1.39	3.01E-05	12.6				102
DT1608C-154	0.1	0.5	0.259	1.59	0.000	1.64E-08	91.1				150
DT1608C-154	0.5	2	17000	0.005	4.94	4.02E-05	75.6				149
DT1608C-154	2	6	0.000	0.000	1.43	4.02E-05	17.5				152
DT1608C-224	0.1	0.5	0.259	1.99	2.00	1.64E-08	159				220
DT1608C-224	0.5	2	17600	0.001	4.38	3.42E-05	145				219
DT1608C-224	2	6	0.418	0.000	1.79	1.01E-04	21.9				223
DT1608C-334	0.1	0.5	3070	3.58	3.35	9.98E-09	296				330
DT1608C-334	0.5	2	16400	0.000	3.09	2.79E-05	207				330
DT1608C-334	2	5	0.765	46.0	1.75	7.62E-04	37.8				338
DT1608C-474	0.1	0.37	1550	4.42	2.22	1.28E-08	362				470
DT1608C-474	0.37	1	39500	0.829	3.25	4.93E-10	300				469
DT1608C-474	1	3	4340	0.000	1.62	1.10E-03	77.8				472
DT1608C-684	0.1	0.3	576	3.12	4.41	1.61E-08	492				680
DT1608C-684	0.3	2	3650	0.000	3.46	8.36E-05	339				682
DT1608C-105	0.1	0.5	0.000	7.46	3.13	2.50E-08	669				999
DT1608C-105	0.5	2	5700	0.000	2.45	8.36E-05	576				1006

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