SPICE Model – 1008PS

This lumped-element (SPICE) model data simulates the frequency-dependent behavior of Coilcraft ferrite surface mount inductors within the frequency range shown in the accompanying table.

The equivalent lumped element model schematic is shown below. The element values R1, R2, C, L, k1 and k2 are listed in the table for each component value. The value of the frequency-dependent variable resistor R_{VAR1} relates to the skin effect and is calculated from:

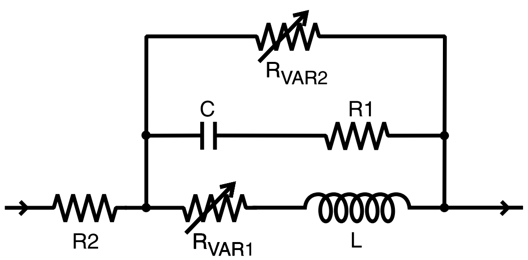
$$R_{VAR1} = k1 * \sqrt{f}$$

- k1 is shown for each value in the accompanying table.
- f is the frequency in Hz

The value of the frequency-dependent variable resistor R_{VAR2} relates to core losses and is calculated from:

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

- k2 is shown for each value in the accompanying table.
- f is the frequency in Hz



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 typical production verification instruments and fixtures.

Typically, the Self-Resonant Frequency (SRF) of the component model will be higher than the measurement of the component mounted on a circuit board. The parasitic reactive elements of a circuit board or fixture will effectively lower the circuit resonant frequency, especially for very small inductance values. Since data sheet specifications are based on typical production measurements, and the SPICE models are based on de-embedded measurements as described below, the model results may be different from the data sheet specifications.

Lumped Element Modeling Method

Measurements were made using a 50 Ohm Agilent/HP 4395A impedance analyzer with an Agilent/HP 16193 test fixture. Calibration was performed using open/short/load standards. Fixture compensation was performed using open and short standards.

The lumped element values were determined by matching 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 lumped element models were used to generate our 2-port S-parameters and therefore give identical results. The S-parameters are available on our web site at **http://www.coilcraft.com/models.cfm**.

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SPICE Model for Coilcraft 1008PS Power Inductors

Part number	Frequency limit of model (MHz) Lower	Upper	R1	R2	C (pF)	L (µH)	k1	k2
1008PS-102	0.1	50	1210	0.061	540	1.0	9.96E-06	0.655
1008PS-152	0.1	45	1470	0.178	600	1.5	8.35E-06	4.22
1008PS-182	0.1	40	2300	0.120	600	1.8	4.64E-05	2.11
1008PS-272	0.1	30	1790	0.120	861	2.7	1.97E-05	3.37
1008PS-392	0.1	30	3380	0.267	503	3.9	1.12E-05	27.0
1008PS-472	0.1	25	4270	0.307	552	4.7	1.54E-06	51.0
1008PS-562	0.1	20	5220	0.369	552	5.6	2.36E-06	204
1008PS-682	0.1	16	4990	0.470	5.13	6.8	1.18E-05	6.35
1008PS-103	0.1	12	8980	0.880	2.73	10	1.18E-05	12.7
1008PS-153	0.1	10	2880	1.25	3.28	15	1.78E-05	18.8
1008PS-223	0.1	9	2670	1.76	2.98	22	2.73E-05	27.1
1008PS-333	0.1	9	1920	2.20	2.95	33	2.81E-05	41.0
1008PS-393	0.1	8	1790	2.02	3.74	39	3.60E-05	41.4
1008PS-473	0.1	8	1010	2.99	3.47	47	3.97E-05	56.3
1008PS-683	0.1	7	559	4.17	3.48	68	4.75E-05	71.7
1008PS-823	0.1	6	506	4.20	4.36	82	6.44E-05	77.0
1008PS-104	0.1	4	553	5.39	4.52	100	1.26E-04	97.9
1008PS-124	0.1	4	594	6.48	4.79	120	1.97E-04	111
1008PS-154	0.1	3.5	462	6.68	5.69	150	2.91E-04	123
1008PS-224	0.1	4	488	9.29	3.63	220	4.65E-04	172
1008PS-334	0.1	2	521	10.7	5.80	330	4.99E-04	196
1008PS-474	0.1	1.8	642	15.1	5.80	470	5.13E-04	251
1008PS-564	0.1	1.5	726	16.0	6.15	560	3.87E-04	323
1008PS-684	0.1	1.3	1150	22.1	4.84	680	6.95E-04	403
1008PS-824	0.1	1	1150	25.1	4.24	819	1.14E-03	504
1008PS-105	0.1	1.2	1520	28.6	5.36	999	1.40E-03	568

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