

SPICE Model – LPS4018

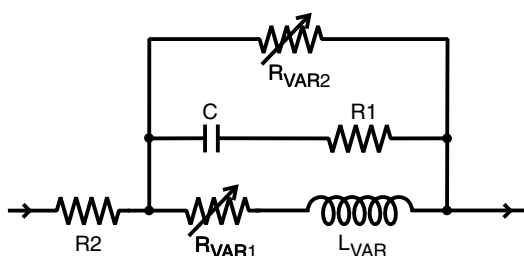
This lumped-element (SPICE) model data simulates the frequency-dependent behavior of Coilcraft power inductors within the frequency range shown in the accompanying table for each individual inductor.

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

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:

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

- $k3$, $k4$, 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.

Coilcraft[®]

Specifications subject to change without notice. Document 267-1 Revised 08/03/07

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 LPS4018 Power Inductors

Part number	Frequency limit of model (MHz)		R1 (Ω)	R2 (Ω)	C (pF)	k1	k2	L _{VAR} Coefficients		
	Lower	Upper						k3	k4	k5
LPS4018-561	0.1	100	450	0.030	1.40	1.40E-04	0.275	0.56	0.010	9.10E-06
LPS4018-102	0.1	100	550	0.040	0.850	1.20E-04	0.195	1.0	0.010	9.00E-06
LPS4018-222	0.1	100	180	0.070	1.34	4.00E-05	0.500	2.2	0.024	9.40E-06
LPS4018-332	0.1	100	120	0.080	2.26	1.80E-04	0.792	3.3	0.083	9.80E-06
LPS4018-472	0.1	80	160	0.125	3.08	2.00E-04	0.890	4.7	0.100	9.70E-06
LPS4018-682	0.1	80	120	0.150	1.70	2.50E-04	1.92	6.8	0.160	9.90E-06
LPS4018-103	0.1	60	170	0.200	2.98	2.20E-04	2.05	10	0.163	9.80E-06
LPS4018-153	0.1	40	240	0.260	3.42	1.70E-04	2.31	15	0.170	9.75E-06
LPS4018-183	0.1	40	14	0.270	2.14	1.00E-03	4.31	18	0.310	9.70E-06
LPS4018-223	0.1	40	180	0.360	3.70	2.70E-04	4.24	22	0.210	9.80E-06
LPS4018-333	0.1	40	8	0.420	2.47	7.00E-04	6.90	33	0.538	9.84E-06
LPS4018-473	0.1	40	20	0.650	2.47	6.90E-04	11.4	47	0.653	9.90E-06
LPS4018-683	0.1	20	55	0.950	2.28	7.80E-04	15.0	68	0.760	9.89E-06
LPS4018-104	0.1	20	10	1.40	3.43	8.80E-04	20.0	100	1.81	9.97E-06
LPS4018-124	0.1	20	15	1.60	3.13	1.20E-03	24.0	120	1.52	9.96E-06
LPS4018-154	0.1	20	11	2.00	2.94	2.00E-03	30.0	150	2.29	9.96E-06
LPS4018-184	0.1	20	10	2.50	3.15	2.30E-03	36.0	180	2.60	1.00E-05
LPS4018-224	0.1	20	18	3.70	2.70	4.00E-03	50.0	220	2.78	1.00E-05
LPS4018-334	0.1	10	50	5.90	3.40	3.90E-03	80.0	330	4.63	1.02E-05
LPS4018-474	0.1	10	15	7.10	3.50	4.40E-03	100	470	7.54	1.03E-05
LPS4018-564	0.1	8	50	10.0	3.97	4.40E-03	115	560	6.80	1.06E-05
LPS4018-684	0.1	8	20	11.5	3.66	3.50E-03	145	680	9.88	1.06E-05
LPS4018-824	0.1	8	30	14.0	3.43	3.80E-03	150	820	11.4	1.07E-05
LPS4018-105	0.1	8	25	16.5	3.93	8.40E-03	200	1000	13.1	1.11E-05
LPS4018-155	0.1	6	200	25.0	3.54	2.00E-03	330	1500	20.2	1.16E-05
LPS4018-185	0.1	4	210	31.5	3.65	2.10E-02	525	1800	21.4	1.20E-05
LPS4018-225	0.1	3	400	32.5	3.49	2.20E-02	700	2200	21.4	1.35E-05
LPS4018-335	0.1	2	430	48.0	3.53	5.80E-03	950	3300	22.5	1.94E-05



Specifications subject to change without notice. Document 267-48 Revised 08/29/06

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>