SPICE Model – MSS1278T

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.

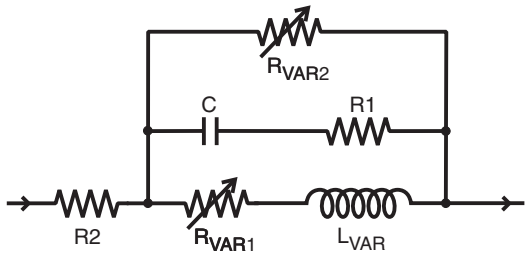
The data represents de-embedded measurements, as described below. Effects due to different customer circuit board traces, board materials, ground planes or interactions with other components are not included and can have a significant effect when comparing the simulation to measurements of the inductors 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:

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

- 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:

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

- 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:

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

- 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 MSS1278T 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
MSS1278T-102	0.1	300	10	0.0063	3.7	8.00E-05	0.24	1.0	0.0085	9.30E-06
MSS1278T-142	0.1	200	6.5	0.0088	3.5	1.20E-04	0.40	1.4	0.0280	9.85E-06
MSS1278T-222	0.1	100	5.1	0.0094	6.1	2.75E-04	0.55	2.2	0.0260	9.10E-06
MSS1278T-272	0.1	100	3.5	0.0101	9.5	1.30E-04	0.86	2.7	0.0750	9.90E-06
MSS1278T-392	0.1	100	4.0	0.0117	8.0	3.15E-04	1.2	3.9	0.160	9.85E-06
MSS1278T-472	0.1	100	5.4	0.0139	3.2	4.25E-04	1.5	4.7	0.073	9.60E-06
MSS1278T-562	0.1	100	3.8	0.0157	5.0	3.00E-04	1.5	5.6	0.089	9.70E-06
MSS1278T-682	0.1	90	4.2	0.0191	8.4	9.25E-04	2.0	6.8	0.130	9.50E-06
MSS1278T-822	0.1	100	5.0	0.0203	5.1	5.40E-04	2.2	8.2	0.200	9.80E-06
MSS1278T-103	0.1	100	7.2	0.0218	9.9	7.50E-04	3.7	10	0.290	9.85E-06
MSS1278T-123	0.1	100	6.0	0.0232	9.2	8.75E-04	3.9	12	0.370	9.85E-06
MSS1278T-153	0.1	80	6.2	0.0279	11.6	7.50E-04	4.8	15	0.370	9.88E-06
MSS1278T-183	0.1	100	4.6	0.0308	11.0	4.00E-03	8.8	18	0.500	9.70E-06
MSS1278T-223	0.1	90	6.5	0.0355	8.2	8.00E-03	8.7	22	0.540	9.30E-06
MSS1278T-273	0.1	70	4.2	0.0450	11.2	1.00E-03	8.6	27	0.470	9.92E-06
MSS1278T-333	0.1	30	15	0.0619	14.3	2.00E-03	11	33	0.690	9.90E-06
MSS1278T-393	0.1	40	12	0.0691	13.7	2.00E-03	13	39	0.840	9.94E-06
MSS1278T-473	0.1	40	9.0	0.0723	11.6	3.00E-03	16	47	1.50	9.94E-06
MSS1278T-563	0.1	30	12	0.0802	15.9	3.00E-03	18	56	1.70	1.00E-05
MSS1278T-683	0.1	40	10	0.0913	13.5	5.00E-03	28	68	2.50	1.00E-05
MSS1278T-823	0.1	50	9.0	0.1259	14.8	4.00E-03	28	82	2.20	1.01E-05
MSS1278T-104	0.1	80	11	0.1351	13.1	5.50E-03	34	100	3.00	1.01E-05
MSS1278T-124	0.1	70	12	0.1823	13.0	5.00E-03	38	120	2.10	1.02E-05
MSS1278T-154	0.1	20	12	0.2165	18.4	7.00E-03	60	150	5.90	1.02E-05
MSS1278T-184	0.1	30	11	0.2290	12.7	1.00E-02	65	180	4.00	1.03E-05
MSS1278T-224	0.1	10	19	0.3236	18.7	8.00E-03	54	220	4.90	1.06E-05
MSS1278T-274	0.1	10	24	0.4156	19.4	7.00E-03	61	270	4.70	1.11E-05
MSS1278T-334	0.1	60	11	0.4873	14.6	1.00E-02	90	330	5.10	1.11E-05
MSS1278T-394	0.1	30	16	0.5336	16.9	1.20E-02	71	390	7.20	1.12E-05
MSS1278T-474	0.1	10	17	0.7075	15.2	1.30E-02	100	470	5.90	1.22E-05
MSS1278T-564	0.1	10	19	0.7774	15.4	1.40E-02	105	560	4.90	1.41E-05
MSS1278T-684	0.1	10	18	1.045	15.3	1.10E-02	100	680	4.90	1.67E-05
MSS1278T-824	0.1	10	28	1.166	19.2	1.40E-02	130	820	6.00	2.21E-05
MSS1278T-105	0.1	9	36	1.334	16.8	2.10E-02	150	1000	11.0	1.75E-05

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