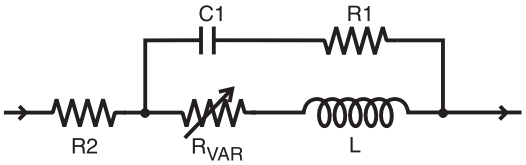
SPICE Model – 026011C

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

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

$$R_{VAR} = k * \sqrt{f}$$

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



Each model should be analyzed only at the input and output ports. Conclusions based on individual lumped element values may be erroneous.

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.

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.

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.

Lumped Element Modeling Method

The measurements were made over a brass ground plane with each component centered over an 0.010 inch (0.254 mm) air gap, as illustrated in Figure 1. The test pads were 30 mil (50 Ohm) wide traces of tinned gold over 25 mil thick alumina, and were not included in the gap. The TRL* calibration plane is also illustrated in Figure 1.

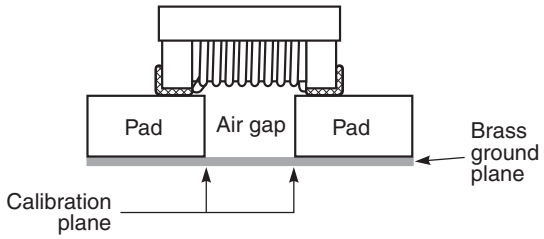


Figure 1. Test Setup

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 up to a frequency just above the self-resonant frequency of the model.

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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Coilcraft®
www.coilcraft.com

US +1-847-639-6400 sales@coilcraft.com
UK +44-1236-730595 sales@coilcraft-europe.com
Taiwan +886-2-2264 3646 sales@coilcraft.com.tw
China +86-21-6218 8074 sales@coilcraft.com.cn
Singapore + 65-6484 8412 sales@coilcraft.com.sg

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SPICE Model for Coilcraft 026011C Chip Inductors

Part number	Frequency limit of model (GHz) Lower	Upper	R1 (Ω)	R2 (Ω)	C (pf)	L (nH)	k
026011C-N75	0.001	35	10	0.030	0.0290	0.750	3.00E-06
026011C-1N7	0.001	35	40	0.060	0.0130	1.70	6.00E-06
026011C-3N0	0.001	14	10	0.082	0.0450	3.00	9.20E-06
026011C-4N7	0.001	12	10	0.110	0.0400	4.70	1.40E-05
026011C-5N1	0.001	11	5.0	0.120	0.0460	5.10	1.50E-05
026011C-5N6	0.001	10	10	0.130	0.0491	5.60	1.80E-05
026011C-6N2	0.001	10	10	0.130	0.0413	6.20	2.00E-05
026011C-6N8	0.001	9.0	10	0.135	0.0491	6.80	2.10E-05
026011C-7N5	0.001	9.0	10	0.155	0.0467	7.50	2.40E-05
026011C-8N2	0.001	8.0	10	0.240	0.0510	8.20	2.50E-05
026011C-9N0	0.001	8.0	10	0.155	0.0444	9.00	3.00E-05
026011C-10N	0.001	8.0	10	0.190	0.0444	10.0	3.00E-05
026011C-11N	0.001	7.0	10	0.280	0.0528	11.0	3.70E-05
026011C-12N	0.001	6.5	10	0.370	0.0535	12.0	3.90E-05
026011C-15N	0.001	5.5	10	0.415	0.0631	15.0	4.80E-05
026011C-16N	0.001	5.5	10	0.315	0.0532	16.0	5.60E-05
026011C-18N	0.001	5.0	10	0.460	0.0623	18.0	5.80E-05
026011C-20N	0.001	5.1	10	0.420	0.0479	20.0	6.90E-05
026011C-22N	0.001	4.7	10	0.540	0.0514	22.0	7.50E-05
026011C-24N	0.001	4.5	10	0.460	0.0514	24.0	8.00E-05
026011C-27N	0.001	4.3	10	0.505	0.0507	27.0	9.00E-05
026011C-30N	0.001	4.4	10	0.800	0.0444	29.9	9.80E-05
026011C-33N	0.001	4.0	10	0.710	0.0474	32.87	1.15E-04
026011C-36N	0.001	4.0	10	1.08	0.0474	35.9	1.18E-04
026011C-39N	0.001	3.75	10	1.00	0.0467	38.8	1.37E-04
026011C-43N	0.001	3.60	10	1.00	0.0473	42.8	1.53E-04
026011C-56N	0.001	3.20	10	1.46	0.0445	55.65	1.60E-04
026011C-68N	0.001	2.90	10	1.92	0.0457	67.8	2.30E-04
026011C-75N	0.001	2.80	10	2.60	0.0457	74.4	1.90E-04

Coilcraft®
www.coilcraft.com

US +1-847-639-6400 sales@coilcraft.com
UK +44-1236-730595 sales@coilcraft-europe.com
Taiwan +886-2-2264 3646 sales@coilcraft.com.tw
China +86-21-6218 8074 sales@coilcraft.com.cn
Singapore + 65-6484 8412 sales@coilcraft.com.sg