Coilcraft S-Parameter Data for RF Surface Mount Inductors
026011C Series Chip Inductors

Coilcraft, Inc.
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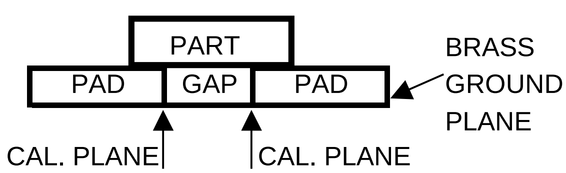
Coilcraft two-port S-parameter data files are based on empirical measurements of Coilcraft RF Surface Mount Inductors. The data files are used as "black box" descriptions, thus reducing complexity in circuit modeling. For one-port applications, simply connect one terminal of the component to ground in your circuit simulator software.

The data files represent de-embedded measurements. Effects due to 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 S-parameters 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 S-parameter models are based on de-embedded measurements as described below, the S-parameter model results may be different from the data sheet specifications.

S-parameter modeling method

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



The S-parameters were generated by matching a simulation model as closely as possible to an average of the original measurements. The model was then used to create the final S-parameters. 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 valid frequency range for each part is specified in Table 1 below.

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Table 1
Valid Frequency Range of S-parameters

Part Number	Range (MHz)		Part Number	Range (MHz)		Part Number	Range (MHz)
026011C-N75	1 – 35000		026011C-9N0	1 – 8000		026011C-27N	1 – 4400
026011C-1N7	1 – 35000		026011C-10N	1 – 8000		026011C-30N	1 – 4000
026011C-3N0	1 – 14000		026011C-11N	1 – 7000		026011C-33N	1 – 4000
026011C-4N7	1 – 12000		026011C-12N	1 – 6500		026011C-36N	1 – 3750
026011C-5N1	1 – 11000		026011C-15N	1 – 5500		026011C-39N	1 – 3600
026011C-5N6	1 – 10000		026011C-16N	1 – 5500		026011C-43N	1 – 3200
026011C-6N2	1 – 10000		026011C-18N	1 – 5000		026011C-56N	1 – 2900
026011C-6N8	1 – 9000		026011C-20N	1 – 5100		026011C-68N	1 – 2800
026011C-7N5	1 – 9000		026011C-22N	1 – 4700		026011C-75N	1 – 4400
026011C-8N2	1 – 8000		026011C-24N	1 – 4500			

S-parameter file description.

All of the S-parameter data files are in the TouchStone format. The following is a typical data segment of a two-port file:

```
# MHZ  S  MA  R 50
!Freq   MagS11  AngS11  MagS21  AngS21  MagS12  AngS12  MagS22  AngS22
1       0.001   59.879  1.000   -0.036  1.000   -0.036  0.001   59.879
22.19   0.014   83.698  0.999   -0.798  0.999   -0.798  0.014   83.698
43.38   0.027   84.582  0.998   -1.558  0.998   -1.558  0.027   84.582
....
```

The first line (header) describes the frequency units, parameter, measurement format and characteristic impedance of the measurement (50 Ohms).

The first column is the frequency in MHz. The next columns are the S-parameters as described in the column headings.

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