

Coilcraft S-Parameter Data for RF Surface Mount Inductors VS Spring Air Core Inductors Series

Coilcraft, Inc.
August, 2013

Coilcraft two-port S-parameter data files are based on empirical measurements of Coilcraft RF Surface Mount Inductors and represent measured behavior as described below. S-parameter data files are used as "black box" descriptions to reduce complexity in circuit modeling.

These 2-port s-parameters simulate the frequency-dependent behavior of Coilcraft VS surface mount air core inductors within the frequency limits shown in the accompanying table (Table 1) for each individual inductor. They are based on measurements using a **1-port impedance analyzer** (HP4991 with 16193A test fixture).

Effects due to different circuit board traces, board materials, ground planes or interactions with other components are not included. They may have a significant effect when comparing the simulation to measurements of the individual inductors using other production verification instruments and fixtures.

S-parameter modeling method

The s-parameters were generated by matching a simulation model as closely as possible to a **1-port measurement** of a typical inductor using an impedance analyzer. The model was then used to create the final 2-port s-parameters. This method results in a model that represents as closely as possible the typical frequency-dependent behavior of the component within the specified frequency limits (see Table 1).

Because our simulation models were used to generate our 2-port S-parameters, they give identical results with the same number of simulation frequency points. The simulation models are available on our web site at <http://www.coilcraft.com/models.cfm>.

The valid frequency range for each part is specified in Table 1 below.

Table 1
Valid Frequency Range of S-parameters

Part Number	Frequency Range (MHz)	Part Number	Frequency Range (MHz)	Part Number	Frequency Range (MHz)
1010VS-23N	1 - 1200	1212VS-22N	1 - 1200	2014VS-33N	1 – 800
1010VS-46N	1 - 700	1212VS-42N	1 - 700	2014VS-66N	1 - 550
1010VS-79N	1 - 700	1212VS-66N	1 - 600	2014VS-111	1 - 480
1010VS-111	1 - 420	1212VS-90N	1 – 520	2014VS-151	1 - 400
1010VS-141	1 - 400	1212VS-111	1 - 480	2014VS-201	1 - 330
				2014VS-251	1 - 240

Coilcraft S-Parameter Data for RF Surface Mount Inductors VS Spring Air Core Inductors Series

S-parameter file description.

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
100    0.001   59.879   1.000   -0.036   1.000   -0.036   0.001   59.879
110    0.014   83.698   0.999   -0.798   0.999   -0.798   0.014   83.698
120    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.

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.