

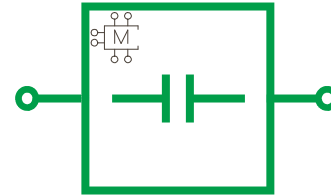
surface mount chip capacitor model



CAP-JOH-0201-001

Model Features

- Land pattern (Pad) scalable
- Substrate scalable
- Broadband (DC to 20 GHz)
- Equivalent circuit topology
- Accurate effective series resistance
- 52 capacitor values (0.2 to 100 pF)
- Developed for microstrip interconnects

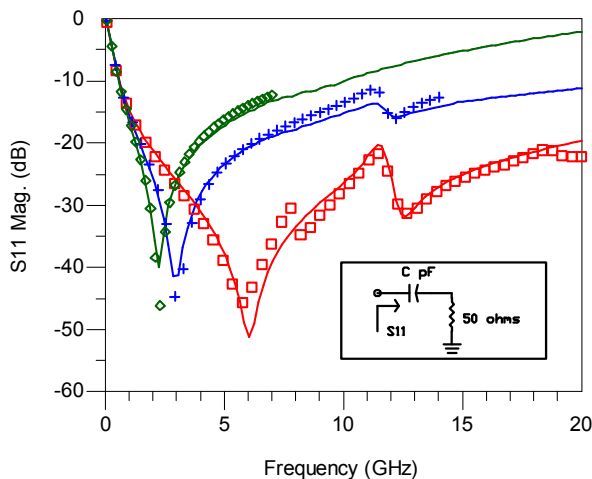


CAP-JOH-0201-001
0.2 to 100 pF
0201 Body Style

Model Description

The CAP-JOH-0201-001 family are substrate scalable models for 0201 surface mount chip capacitors from Johanson P/N 0201L. The models are for use with microstrip applications and account for substrate (or printed circuit board) related parasitic effects. Substrate height, dielectric constant, loss tangent, interconnect metal thickness, component tolerance, pad width, pad length, and pad gap are model input parameters. Models account for up to two higher-order resonant frequency pairs beyond the fundamental series resonant frequency. Accurate effective series resistance (ESR) is modeled over the frequency range. A single, substrate scalable Global Model™ is available that accurately emulates all capacitor values within the valid capacitance range.

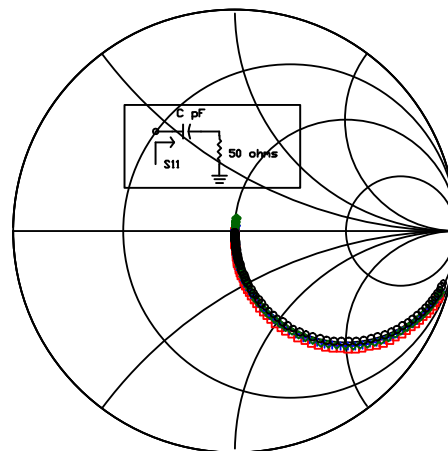
Frequency Sweep



Legend: □ 4mil Rogers 4350B, + 14mil FR4, ◇ 59mil FR4, Lines - Model, Symbols - Measured data. Measured data stops at highest valid frequency for each substrate.

S11 for an 8.2 pF capacitor mounted on various substrates from 0.04 to 20 GHz.

Part Value Sweep



Legend: □ 4mil Rogers 4350, + 14mil FR4, ◇ 59mil FR4, ○ Ideal

Model S11 at 2 GHz for capacitor values from 0.2 to 100 pF on various FR4 substrates compared to an ideal capacitor response.



Technical Notes

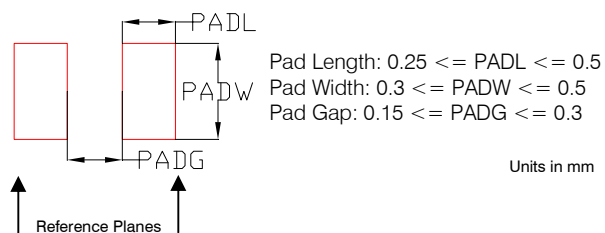
- Two-port S-parameters are measured using a vector network analyzer and on-board probing with calibration referenced to the outside edges of the component pad stack.
- Capacitors are measured in a series microstrip configuration. Models for alternative interconnect configurations (e.g. coplanar waveguide) are available upon request.
- ESR is measured using a Boonton resonant line.
- Substrates used to extract the models: 4 mil Rogers 4350B, 14, and 59 mil FR4.
- Typical range of valid substrate types (substrate height H in mils and dielectric constant Er): $1 \leq H/Er \leq 16$.
- Additional information about JOH 0201L capacitors is available at <http://www.johansontechnology.com>

Capacitor Values (pF)

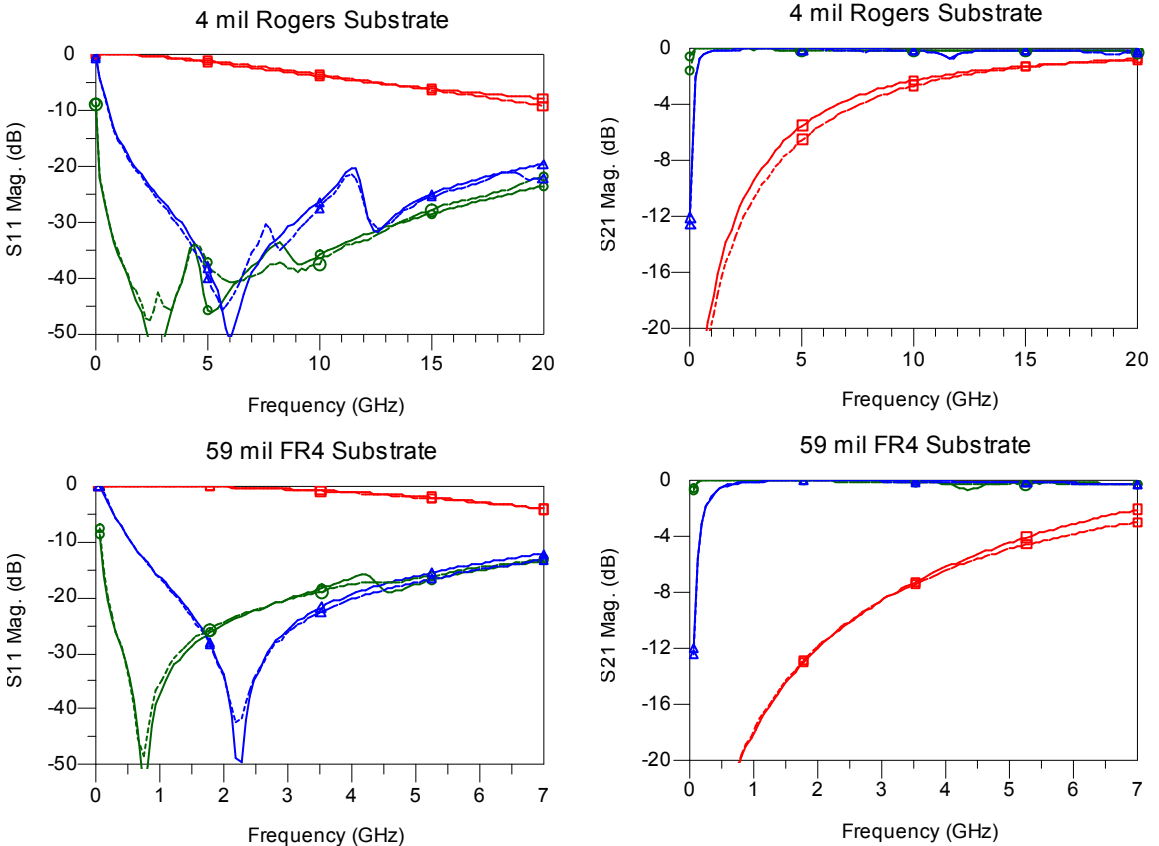
0.2	1	2.4	5.1	11	24	56
0.3	1.1	2.7	5.6	12	27	68
0.4	1.2	3	6.2	13	30	82
0.5	1.3	3.3	6.8	15	33	100
0.6	1.5	3.6	7.5	16	36	
0.7	1.8	3.9	8.2	18	39	
0.8	2	4.3	9.1	20	43	
0.9	2.2	4.7	10	22	47	

All capacitor values represent measurement-based models.

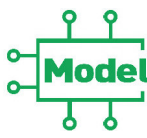
PC Board Footprint



Typical Measured Series 2-port S-parameter Data Versus Simulated Data



Legend: □ 0.2 pF, △ 8.2 pF, ○ 82 pF, Solid lines - Model data, Dashed lines - Measured data



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