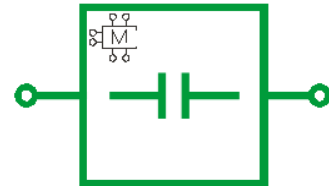


Model Features

- Broadband validation: DC – 65GHz
- Equivalent circuit based
- Substrate scalable: ($0.5 \leq H/Er \leq 13.5$)
- Land Pattern (Pad) scalable
- Accurate effective series resistance
- Developed for microstrip interconnects
- Orientation: Horizontal



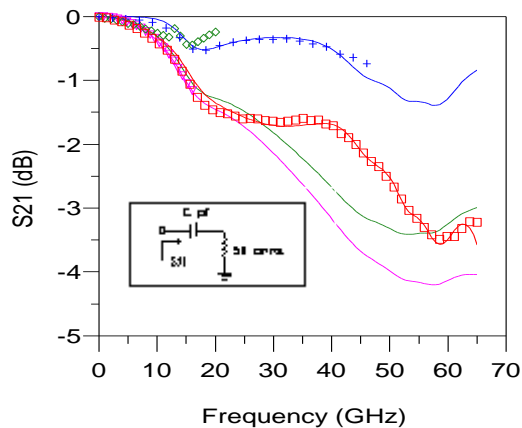
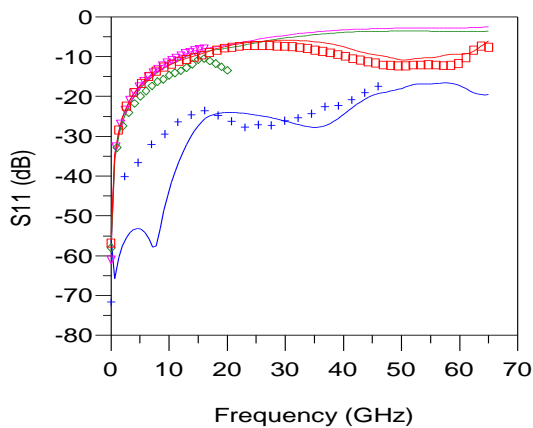
CAP-PPI-0201BB-001
DC Block
0201 Body Style

Model Description

The CAP-PPI-0201BB-001 is a substrate scalable Global Model™ for the Passive Plus P/N 0201BB surface mount chip capacitor family (additional information is available at www.passiveplus.com). 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 Sim_mode switch allows pad stack effects to be disabled.

The pad dimensions used to develop datasheet plots for the model are: length = 0.3556 mm, width = 0.33 mm, gap = 0.127 mm.

Frequency Sweep



Legend: □ 5mil Alumina, + 6.6mil Rogers 4350B, ◇ 30mil Rogers 4003C, △ 31mil Rogers 4003C, Lines - Model, Symbols - Measured data. Measured data stops at highest valid frequency for each substrate. S11 for 0.1uF capacitor mounted on various substrates from 0.01 to 65 GHz.

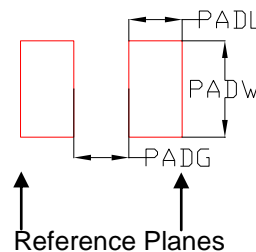
Technical Notes

- Two-port S-parameters were measured using a vector network analyzer and on-board probing with calibration referenced to the outside edges of the component pad stack.
- Capacitors were measured in a series microstrip configuration. Models for alternative interconnect configurations (e.g. coplanar waveguide) are available upon request.
- Substrates used to extract the models: 5mil Alumina, 6.6 mil Rogers 4350B, 31 mil Rogers 4003C, and 30 mil Rogers 4003C.
- Typical range of valid substrate types (substrate height H in mils and dielectric constant Er):
 $0.5 \leq H/Er \leq 13.5$.
- Effective series resistance (ESR) was measured using a 34A Boonton Coaxial Resonator Line.
- Highest frequency for measurement validation: : 65 GHz (5mil Alumina), 46 GHz (6.6 mil Rogers 4350B), 20 GHz (31 mil Rogers 4003C), and 16 GHz (30 mil Rogers 4003C).
- Multiple simulation modes (Sim_mode) are available - full mode, ideal mode and no pad stack.

Device in Position



PC Board Footprint



$$8.00 (0.20) \leq PADL \leq 22.05 (0.56)$$

$$12.00 (0.30) \leq PADW \leq 20.47 (0.52)$$

$$1 (0.03) \leq PADG \leq 8 (0.20)$$

Units in mils (mm)

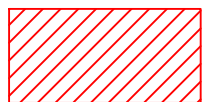
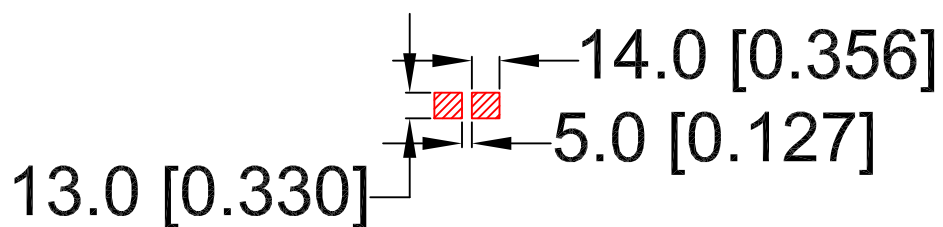
Model Input Parameters

- Subst - Microstrip substrate instance name. The model will reference the named substrate instance to obtain values for H, Er, T and TanD.
- Sim_mode - 0 for full parasitic model, 1 for ideal element, 2 for removing pad effects.
- Pad_mode - 0 for default to Sim_mode, 1 for pads always in layout, 2 for pads never in layout
- Tolerance - Tolerance of the part value. The nominal value for this parameter should be set to 1. Use for statistical distribution.
- Pad_Width - Width of land pattern footprint
- Pad_Length - Length of land pattern footprint
- Pad_Gap - Gap between land pattern footprint

Model and Datasheet Revision Notes

12/12/2013	Original model and datasheet development
03/31/2014	Updated pad range

TEST BOARD



Denotes plated copper land pattern free of solder mask.



CONTROLLING DIMENSIONS - MILS (0.001")
[METRIC DIM - mm] FOR REFERENCE ONLY

Scale
NOT TO
SCALE

Drawn by
MDLX

Title Modelithics, INC.

File Name CAP-PPI-0201BB-001_datasheet.dwg
Date 03-31-2014 Sheet 1

Rev
1