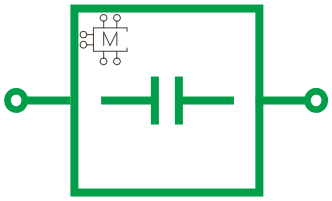
surface mount chip capacitor model

Model Features

- Land pattern (pad) scalable
- Substrate scalable
- Broadband (DC to 65 GHz)
- Equivalent circuit topology
- Accurate effective series resistance
- DC blocking capacitor
- Developed for microstrip interconnects

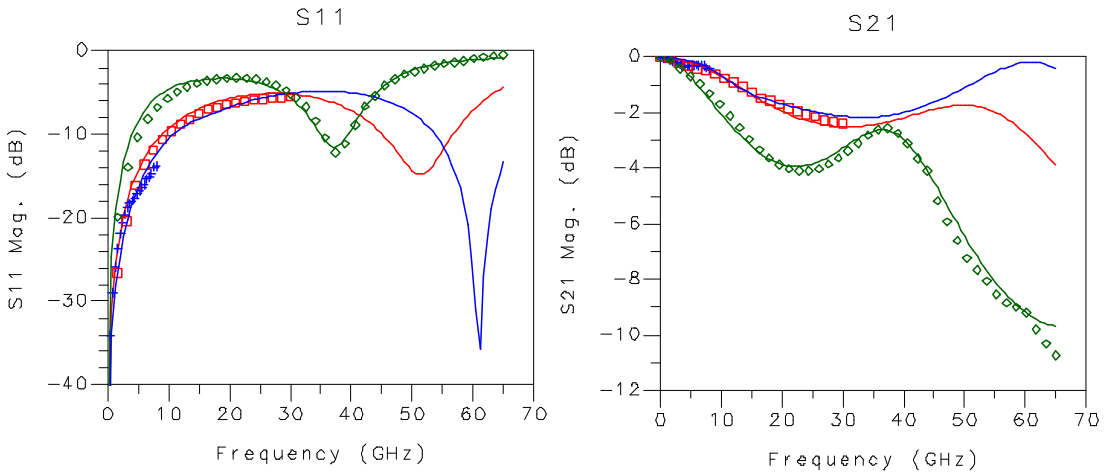


CAP-AVX-GX02-001
DC Block
0402 Body Style

Model Description

CAP-AVX-GX02-001 is a substrate scalable model for the AVX GX02ZZ104MAT2 (0.1uF) ultra broad band capacitor. The model is for use with microstrip applications and accounts 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. Effective series resistance (ESR) was measured to 1GHz and incorporated into the model. A Sim_mode switch allows pad stack effects to be disabled. This model has been validated to 65 GHz on a 5 mil Alumina substrate, and to lower frequencies using additional printed circuit board materials (see Technical Notes).

Substrate scaling



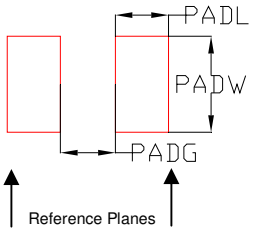
Legend: □ 4mil Rogers 4350B, +60mil Rogers 4003, ◇5mil Alumina, Lines - Model, Symbols - Measured data. Measured data stops at highest valid frequency for each substrate (4 mil - 30 GHz, 60 mil - 8 GHz, 5 mil Alumina - 65 GHz).
Note: The pad dimensions used for the plots are: PADL = 15.5mil, PADW = 28.0mil, PADG = 16.0mil

CAP-AVX-GX02-001

Technical Notes

- Two–port S-parameters measured using a vector network analyzer and on-board probing with calibration referenced to the outside edges of the component pad stack.
- Capacitors 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: 4 mil Rogers 4350B, 60mil Rogers 4003 and 5 mil Alumina.
- Typical range of valid substrate types (substrate height H in mils and dielectric constant Er): $0.5 \le H/Er \le 16.6$.
- Highest frequency for measurement validation: 8 GHz (60 mil RO4003), 30 GHz (4 mil RO4350B) and 65GHz (5 mil Alumina)
- Additional information about AVX GX02 capacitors is available at http://www.avx.com

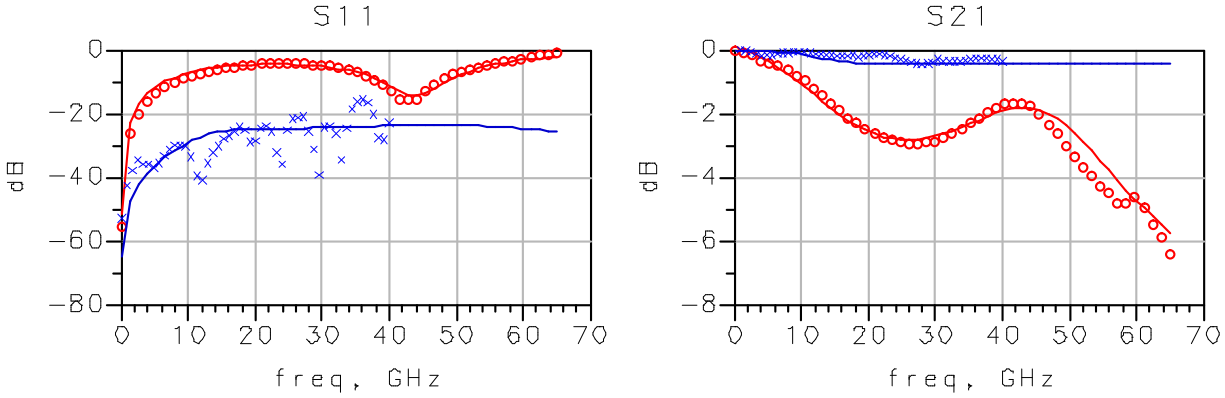
PC Board Footprint



Pad length: 14 <= PADL <= 25
Pad width: 20 <= PADW <= 35
Pad gap: 14 <= PADG <= 19

Units in mils

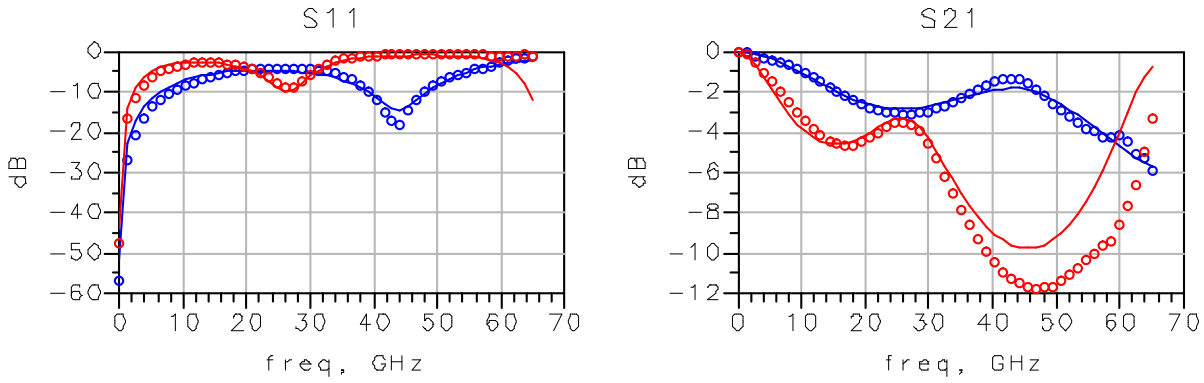
Typical S parameter performance of the model



Legend: o - 5mil Alumina, x - 10mil Rogers 4350B
Line - model performance and symbol - measurement data

Notes:
1) Data shown in plots corresponds to the following pad dimensions: PADL = 14.0mil, PADW = 20.0mil, PADG = 16.0mil
2) 10mil Rogers 4350 measurement data is supplied by ATC. The pad dimensions used for the measurement: PADL = 8.0mil, PADW = 22.0mil, PADG = 24.0mil

Performance Comparison using Different Pad Sizes



Legend:
Line - Model performance on 5 mil Alumina
Symbol - Measured data on 5 mil Alumina
Blue - Model performance and measured data shown in plots corresponds to PADL = 14.0mil, PADW = 20.0mil, PADG = 16.0mil
Red - Model performance and measured data shown in plots corresponds to PADL = 25.0mil, PADW = 33.0mil, PADG = 16.0mil