Precision Measurements and Models You Trust

Modelithics CLR Library for CADENCE

The Modelithics CLR Library will provide Cadence users the ability to simulate entire IC+BOARD designs in multi-layer PCB and LTCC configurations and capture complete, broadband parasitic effects using the industry's only substrate scalable and part-value scalable equivalent circuit models for surface mount passive RLC components.

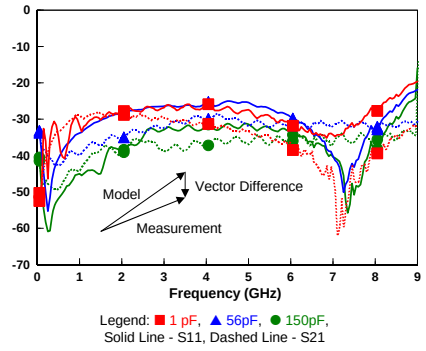
Modelithics Global Models are engineered to help you accelerate your design process. Surface mount parts simply do not behave the same on all substrates, regardless of the technology. The versatility and accuracy of substrate– and part value -scalable models help to ensure proper component selection at the simulation stage. Bench turning and prototype builds decrease. You can concentrate on designing your next product!

Model Accuracy

Model accuracy is quantified based on the magnitude of the vector difference $|D_{vector}|$ between measured and model-generated S-parameters:

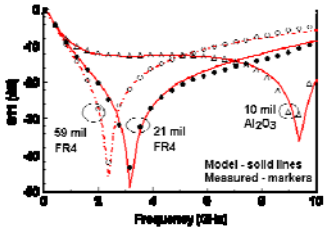
$$|D_{vector}| = |S_{i,j} - S'_{i,j}|$$

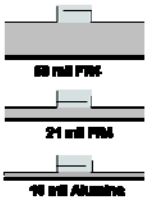
where $S_{i,j}$ is a measured S-parameter and $S'_{i,j}$ is a model-generated S-parameter. This measure of accuracy accounts for magnitude and phase difference. The typical worst-case vector difference for Modelithics models is <0.05 across the valid frequency range, which extends to 10 GHz or greater for most models in the library. The vector difference may exceed the 0.05 limit near frequencies where higher-order



Legend: ■ 1 pF, ▲ 56pF, ● 150pF,
Solid Line - S11, Dashed Line - S21

Substrate Scalability





Part Value Scalability

Each Global Model pertains to a given component vendor and body style (e.g., 0201) and typically covers values over 2 to 3 decades (e.g., 1-1800 pF).

Global Models automate part-value substitution & improve the efficiency of circuit design optimization.

Substrate Scalability

The models are valid over a continuous range of substrate thickness and dielectric constant bounded by the fixtures used for model development.

Substrate scalability is critical in achieving accurate simulation results; this distinguishes our models from all others.

Pad Model

The models implement the lumped-element-based transmission line model and emulate the pad effects.

This feature combined with the frequency-dependent ESR allows the global models to work smoothly in time-domain simulation such as envelope simulation, etc.

Frequency-Dependent ESR

Each model is based on precise Effective Series Resistance (ESR) measurements. The empirical data is used to generate a frequency-dependent expression that is incorporated into the models through ladder networks.

Accurate ESR, combined with the substrate scaling feature of the models, enables prediction of Q-factors in your PCB environment.

For ordering information, visit www.modelithics.com. Custom model development services are also available.

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