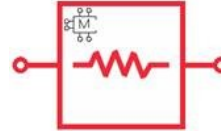## Model Features

- Broadband validation: DC – 60 GHz
- 3D Geometry model
- Part value selectable (50 and 100 Ohm)
- Validation: Multi-substrate S-Parameters

  See Technical Notes for more details

RES-PPI-2010BB-001
(50 and 100 Ohm)
2010 Body Style

Model Version

A Microwave Global Model™ (equivalent circuit model) is also available for the RES-PPI-2010BB-001 (Passive Plus P/N R35-2010BBxxR00FR1QE) in ANSYS® Electronics Desktop which is part value scalable and can interpolate to any part value in the modeled range. 3D geometry models are available for all highlighted part values in the table below.

Model Description

The RES-PPI-2010BB-001 is an encrypted 3D geometry model available in ANSYS® HFSS™ for the Passive Plus P/N R35-2010BBxxR00FR1QE surface mount chip resistor (additional information is available at Passive Plus). The models are for use in 3D simulations with microstrip applications. The models are validated with measured single-substrate S-Parameters.

3D geometry models are well suited to capture coupling or close proximity effects of components with their environment that would not be possible with equivalent circuit models.
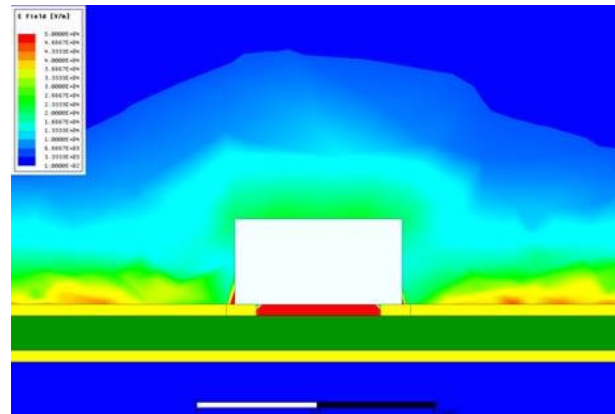
Physical PCB pad dimensions used for model validations on 4mil Rogers 4350B are: length = 2.5 (0.06), width = 8.5 (0.22), gap = 14.5 (0.37). Units in mil (mm).

3D Model Image
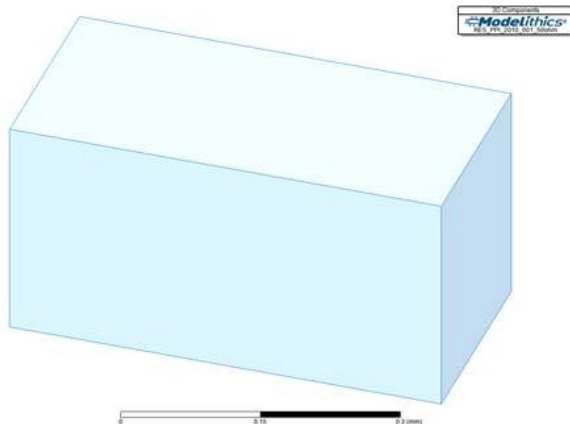
Legend: Image of 3D geometry model for the R35-2010BB50R00FR1QE resistor. Model reference planes are at component lead edge.

E-Field Visualization

Legend: E-field plot of 3D geometry model for the R35-2010BB50R00FR1QE (50 Ohm) resistor on 4 mil Rogers 4350B.

Technical Notes

- Model reference planes are at component lead edge. No pad stacks, substrate or test fixture are included in the model. Test fixture elements must be added as part of the simulation when comparing to measured data.
- 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.
- Substrate used to validate the models: 4mil Rogers 4350B, 20mil Rogers 4350B, 60mil Rogers 4003C.
- Highest frequency for measurement validation: 60GHz (4mil Rogers 4350B), 25 GHz (20mil Rogers 4350B), and 10 GHz (60mil Rogers 4003C)

Resistor Values (Ohm)

50	100

Highlighted resistor values represent measurement validated 3D models. Purple highlighted values are represented by measurement validated 3D models. Table shows 2 part values in the component family range, all of which are represented by the Microwave Global Model™ (equivalent circuit model) available for use in the HFSS circuit simulator and for EM -circuit co-simulations.

# 4 mil Rogers 4350B Simulation Settings

- Solution frequency: 10GHz
- Wave port width: 42mil
- Wave port height: 24mil
- 50 ohm feedline width: 7mil
- 50 ohm feedline length: 35mil
- 50 ohm feedline metal thickness: 1.3mil

S11 (Model vs Measured)

Legend: Solid lines - Model data, symbols - Measured data. S11 for 50 and 100 Ohm resistors mounted on 4mil Rogers 4350B from 0.05 to 60GHz.
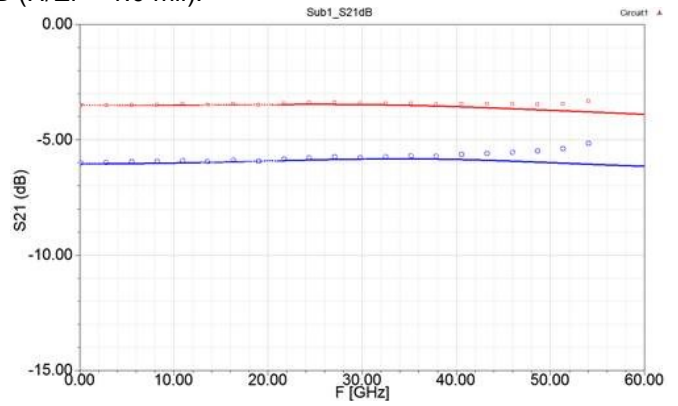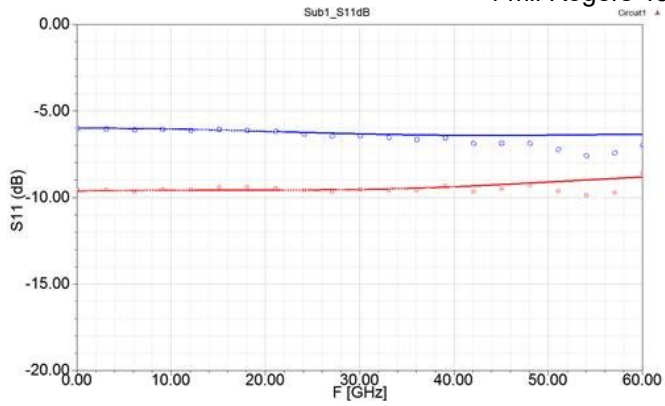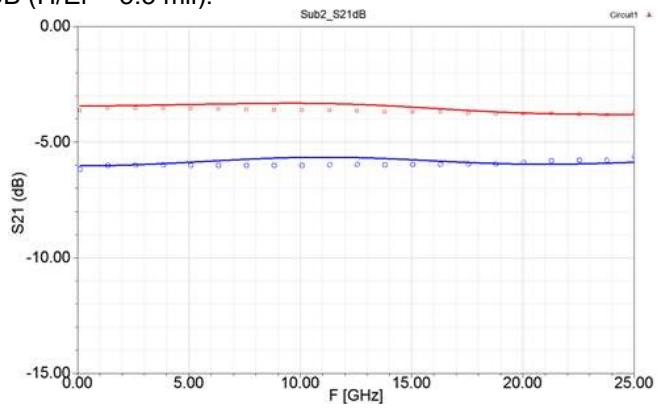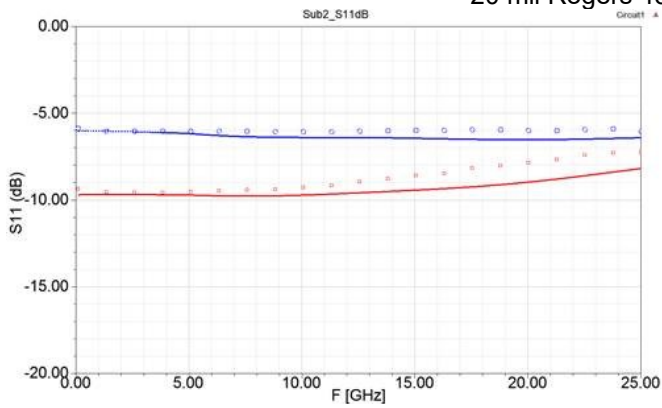
Transmission Coefficient and Phase
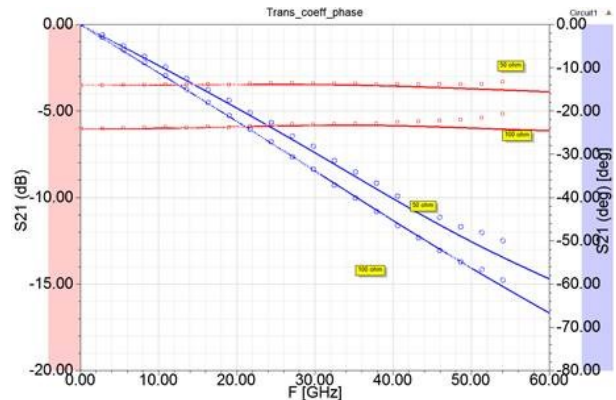
Legend: Solid lines - Model data, symbols - Measured data. S21 magnitude and phase response for 50 and 100 Ohm resistors mounted on 4mil Rogers 4350B from 0.05 to 60GHz.
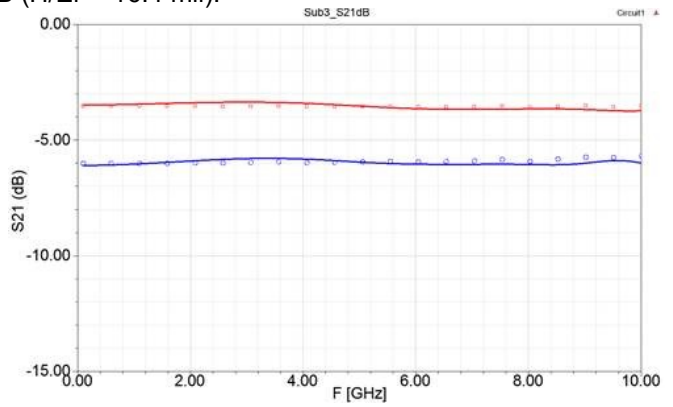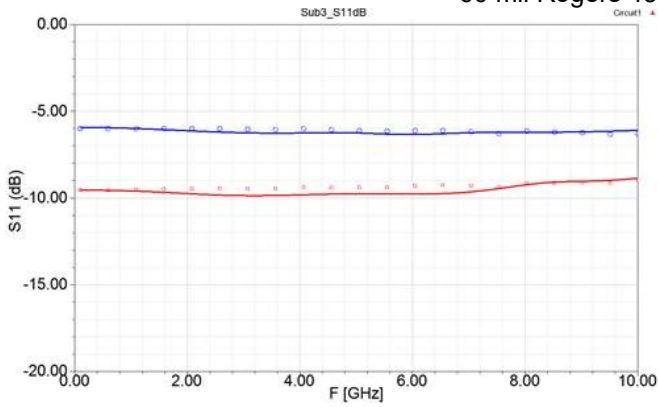
Model vs. Measured Series 2-port S-Parameter Data
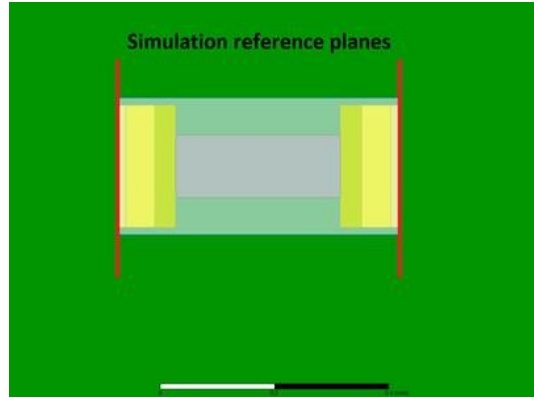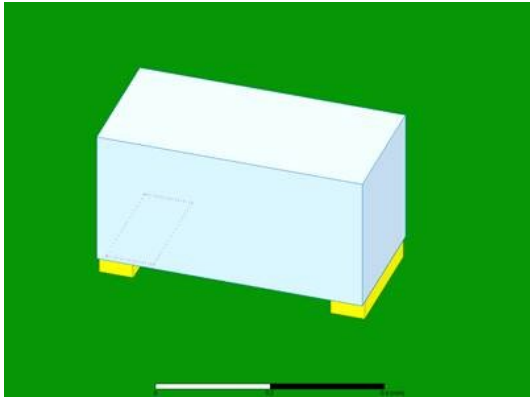
4 mil Rogers 4350B (H/Er = 1.0 mil):

20 mil Rogers 4350B (H/Er = 5.3 mil):

60 mil Rogers 4350B (H/Er = 16.4 mil):

Legend: □ 50 ohms, , o 100 ohms, solid lines - Model data, symbols - Measured data

Reference planes for the simulation are at the edge of the component pad stack. Reference plane separation 19.5mils.

Model and Datasheet Revision Notes

11/16/2020   Original model and datasheet development