Modelithics®

World's Best RF & Microwave Simulation Models

Modelithics® Mini-Circuits Library

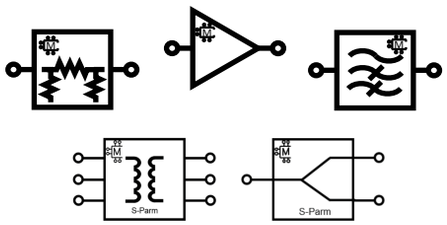
for High Accuracy Electronic Simulation

Modelithics® Vendor Partner

Mini-Circuits®

OVERVIEW

The Modelithics Mini-Circuits MVP Library is a collection of highly accurate measurement-based simulation models that are compatible with popular Electronic Design Automation (EDA) software tools. These models offer accurate broadband prediction including parasitic effects and feature scalable design parameters such as component value, pad dimensions, and substrate properties. These state-of-the-art models install seamlessly into the EDA software, placing high accuracy models at your fingertips and allowing for first pass design success!



LIBRARY FEATURES

The Modelithics Mini-Circuits MVP Library offers a collection of Microwave Global Models™ that provide many advantages over ideal and S-parameter file-based models. Valuable features of the models include:

- **MEASUREMENT-BASED** — Each global model is developed using highly accurate measurements across multiple conditions including different substrates and pad dimensions. By developing models using measurements, designers can have confidence that their simulations will represent real-world conditions.
- **SCALABLE** — The models can be scaled for inductance value and substrate properties, allowing designers to simulate based on their specific conditions.
- **OPTIMIZATION AND STATISTICAL ANALYSIS** — Model parameters can be tuned and optimized in the EDA software to provide best case parameter selection rapid achievement of design goals. Model parameters can also be set up for statistical analysis.
- **AVAILABLE FOR POPULAR EDA TOOLS** — Keysight Technologies' Advanced Design System (PathWave ADS), Cadence® AWR Design Environment®, Keysight Technologies' PathWave RF Synthesis (Genesys), Ansys® HFSS™, Sonnet® Suites™, and Cadence Spectre RF® Option.
- **COMPLETE DOCUMENTATION** — Each model contains a comprehensive model datasheet that lists recommended model validity parameters, measurement and test fixture details, and model-to-measurement data comparisons.

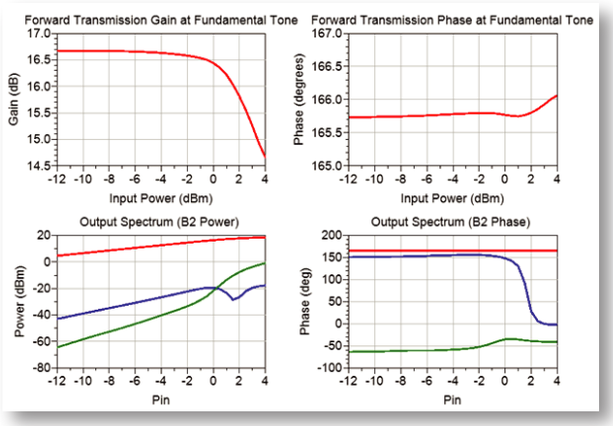
Literature Showcasing Modelithics Mini-Circuits Models:

Video: Optimized LNA Design

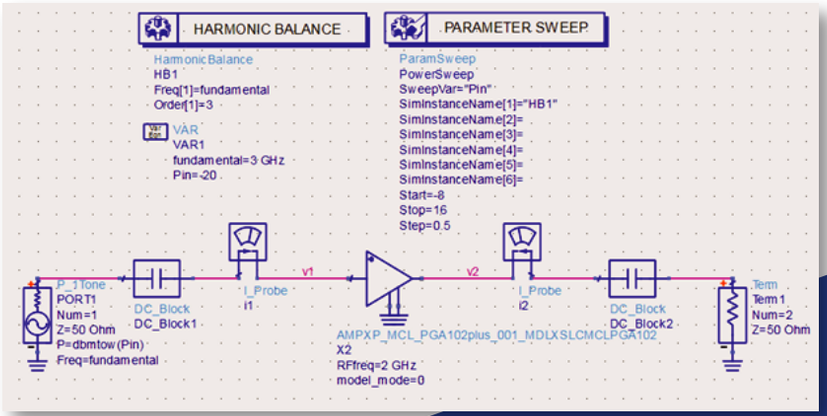
Article: Accurate Simulation Models Enable First-Pass LNA Design

Article: Simulating Modelithics X-Parameter Amplifier Models in a Keysight Genesys Design Environment

Application Note 059: Using Modelithics X-Parameter Models in an ADS Design Environment



X-Parameters harmonic balance simulation of PGA-102+ amplifier model with Vcc=3.3V on 10 mil Rogers 4350B substrate (200MHz, 50Ω in/out, Model_mode=1).



------Red = fundamental
------Blue = 2nd harmonic
------Green = 3rd harmonic

Excellence in Modeling Since 2001

* "X-parameters" is a trademark of Keysight Technologies, Inc. The X-parameters format and underlying equations are open and documented. For more information, refer to X-parameters Open Documentation, Trademark Usage & Partnerships.

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List of Components in the Modelithics® Mini-Circuits MVP Library

Amplifiers**		Splitters	Low Pass Filters				
AVA-183+	PMA2-43LN+	EP2C+	LFCG-1000+*	LFCN-1700+*	XLF-641M+	XLF-133+	XLF-861+
GVA-62+	PMA2-133LN+	EP2K1+	LFCG-1575+*	LFCN-1800D+*	XLF-13H+	XLF-151+	XLF-962+
GVA-63+	PMA2-83LN+	EP2K+	LFCG-1700+*	LFCN-1800+*	XLF-112H+	XLF-173+	XLF-982+
GVA-84+	PMA-545+	EP2W1+	LFCG-2250+*	LFCN-2250+*	XLF-122H+	XLF-192+	LFCN-490+*
PGA-102+	PMA-5451+	EP2W+	LFCG-2850+*	LFCN2850+*	XLF-132H+	XLF-221+	LFCN530+*
PGA-103+	PMA-5452+	EPQ133+	LFCG-320+*	LFCN-3000+*	XLF-172H+	XLF-252+	**Transistors**
PGA-105+	PMA-5453+	**Band Pass Filters**	LFCG-400+*	LFCN-320+*	XLF-252H+	XLF-312H+	SAV-331+
PHA-1+	PMA-5454+	XBF-163+	LFCG-530+*	LFCN-3800+*	XLF-14+	XLF-332+	SAV-541+
PHA-22+	PMA-5455+	XBF-183+	LFCN-1000+*	LFCN-400+*	XLF-63+	XLF-362H+	SAV-581+
PMA2-33LN+	PMA-5456+	XBF-282+	LFCN-1200D+*	LFCN-4400+*	XLF-63H+	XLF-421+	TAV2-14LN+
PSA4-5043+	**Transformers**	**Attenuators**	LFCN-1200+*	LFCN-630+*	XLF-73+	XLF-551+	TAV2-501+
	NCS1-63+	RCAT	LFCN-120+*	LFCN-80+*	XLF-122+	XLF-732+	**Coupler**
	NCS2-83+	YAT	LFCN-1575+*	XLF-42M+	XLF-123+	XLF-762+	JR1BDplus
	NCS1-422+	YAT-A	**High Pass Filters**				
	NCS2-392+	KAT	HFCN-2700+*	HFCN-880+*	XHF-292M+	XHF-14M+	XHF2-912+
			HFCN-3800+*	XHF-581M+	XHF-23+	XHF-63M+	XHF2-1162+
			HFCN-5500+*	XHF-721M+	XHF-252+	XHF-143M+	XHF2-1352+
			HFCN-740+*	XHF-53H+	XHF-392+	XHF2-153+	XHF2-1832+

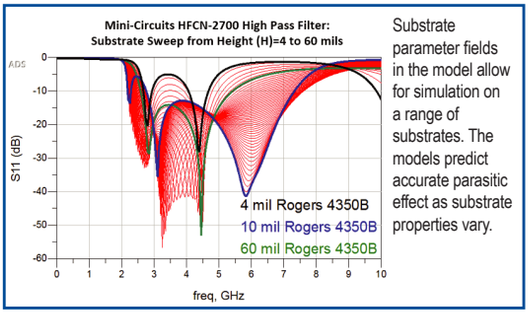
***3D version also available for Ansys HFSS**

***X-Parameters-based model versions available*

*Visit our website for an updated complete list, and see our available Pre-Release models (**https://www.modelithics.com/Model/PreRelease**)*

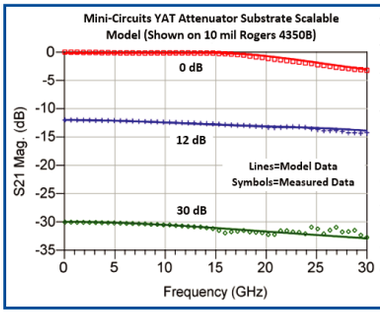
Advanced Model Features for More Accurate High Frequency Design

Substrate Scalability



Substrate parameter fields in the model allow for simulation on a range of substrates. The models predict accurate parasitic effect as substrate properties vary.

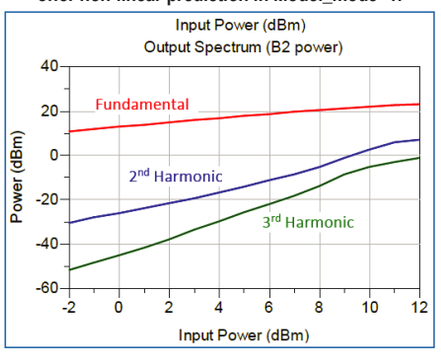
Part Value Scalability/Selectability

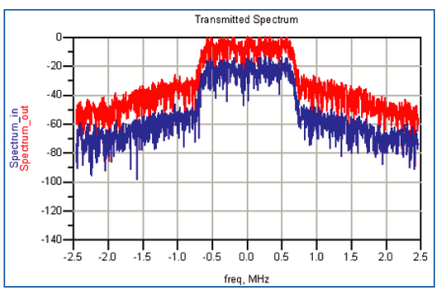


When a range of part values is available for a device series, one model represents all values available. Different values can be tested simply by changing the applicable part value parameter. This field can also be tuned and optimized.

X-Parameters Simulation

X-Parameters-based Mini-Circuits amplifier models offer non-linear prediction in Model_mode=1.

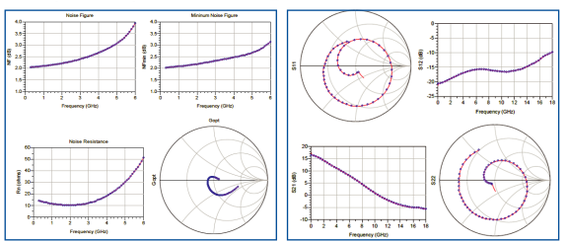




[**Top**] PHA-1+ modeled output spectrum fundamental, 2nd and 3rd harmonics.
[**Bottom**] Envelope domain simulation of a CDMA signal using PHA-1+ model input and output spectrum.

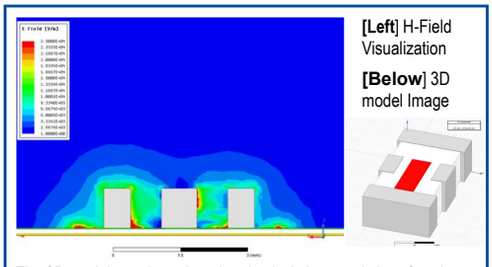
Broadband Simulation

Amplifier X-Parameter models offer broadband noise and S-parameter prediction in Model_mode=0.



[Left] Noise model for PHA-1+ amplifier (clockwise from top left) Noise Figure, NFmin, Gopt, Noise Resistance to 6 GHz.
[Right] PHA-1+ S-parameters to 18 GHz model vs. measured.

Ansys HFSS 3D EM Models



[**Left**] H-Field Visualization

[**Below**] 3D model Image

The 3D models are based on the physical characteristics of each component and can be used in full wave 3D electromagnetic (EM) simulation, including shielding design, effects of parts in close proximity, and more. Shown above is the 3D geometry model for the Mini-Circuits LFCN-2250+ high pass filter on 4mil Rogers 4350B.

What's in YOUR DREAM LIBRARY?

Help us build ***YOUR*** dream library! Pre-Release models are added based on customer demand. Share your desired models with **sales@modelithics.com**!

Visit the Mini-Circuits MVP Page on the Modelithics website to:

- Explore the current list of available Mini-Circuits component models
- View model datasheets
- Browse literature collection for application notes, presentations, etc.
- Download for FREE* the Modelithics Mini-Circuits model for **Keysight ADS and Ansys HFSS**!
- FREE* 90 day trials for other simulators are also available! Request a FREE trial today!

www.Modelithics.com/MVP/Mini-Circuits

*with approval and/or valid registration

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