

Overview

The Modelithics® Mini-Circuits Library of simulation models for Mini-Circuits components brings incredible broadband accuracy and advanced analysis capability to electronic designs that incorporate these parts. Modelithics models offer unique features such as substrate scalability, part value scalability/selectability, and non-linear performance (among others) which enable accurate high frequency parasitic simulation. The models help designers save time and cost by increasing first-pass design success.

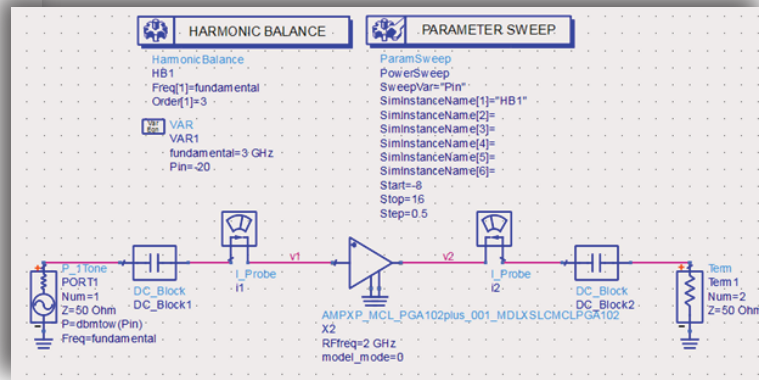
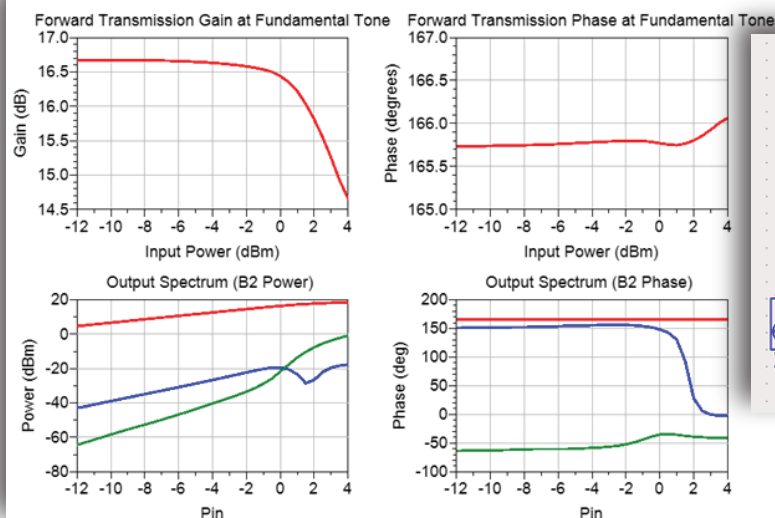
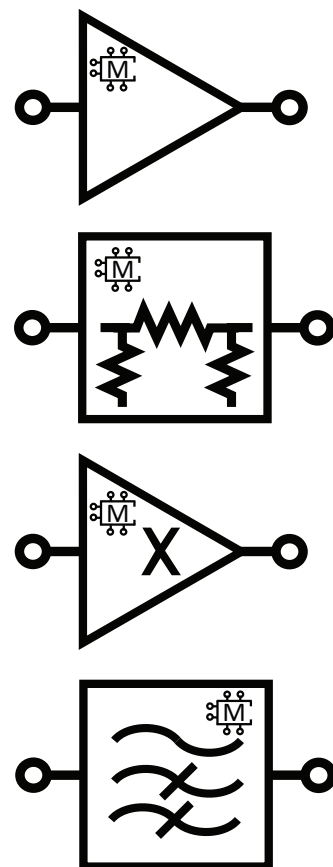
Library Features

The Modelithics Mini-Circuits Library contains an extensive collection of models for various Mini-Circuits components including amplifiers, filters and attenuators. The models install seamlessly with Keysight ADS and other EDA tools, making the models easily accessible in the element palette within the simulator. Valuable features of the models include:

- Measurement-based—Each model is developed using specialized, Modelithics precision measurements under device-specific test conditions.
- Scalability—part-value, substrate, and pad-size scalability/selectability are incorporated into many of the models.
- Model documentation—each model contains a model datasheet that lists recommended model validity parameters, measurement and test fixture details, and model-to-measurement data comparisons.
- X-Parameters* models—X-Parameter models for Mini-Circuits amplifiers provide accurate small-signal (broadband S-parameters and noise parameters) and non-linear simulations for integrated circuit devices without requiring detailed knowledge of internal circuitry.

Modelithics®
Vendor Partner

Mini-Circuits®



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

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

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

Amplifiers*	High Pass Filters	Low Pass Filters	
GVA-62+	HFCN-2700+	LFCN-1000+	LFCN-3000+
GVA-63+	HFCN-3800+	LFCN-1200D+	LFCN-3800+
GVA-84+	HFCN-5500+	LFCN-1200+	LFCN-400+
PGA-102+	HFCN-740+	LFCN-120+	LFCN-4400+
PGA-103+	HFCN-880+	LFCN-1700+	LFCN-490+
PGA-105+	Attenuators	LFCN-1800D+	LFCN-630+
PHA-1+	RCAT	LFCN-1800+	LFCN-80+
PHA-22+	YAT	LFCN-2250+	
PSA4-5043+			

*X-Parameters-based model versions available

**Visit our website for an updated complete list, and see our available Pre-Release models (www.Modelithics.com/MVP/MiniCircuits)

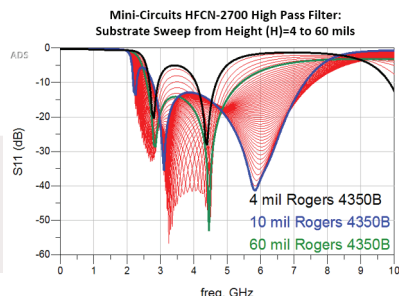
Advanced Model Features for More Accurate High Frequency Design

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.



HFP_MCL_HFCN2700_001_MDLXSLMCLHFCN2700
MDLX_FLTR1
H=0.127 mm
Er=4.3
T=0.043 mm
TanD=0.022

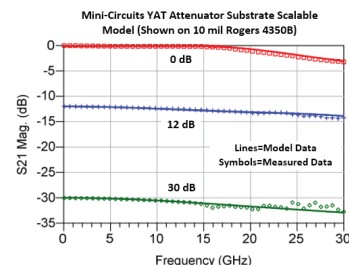


Part Value Scalability/Selectability

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.

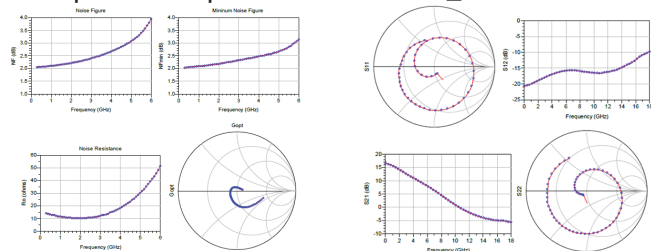


ATT_MCL_RCAT_001_S_MDLXSMCLRCAT1
MCL_RCAT_ATT1
ATTN=0 dB
Subst="MSub1"
Sim_mode=0 - Full Parasitic Model



Broadband Simulation

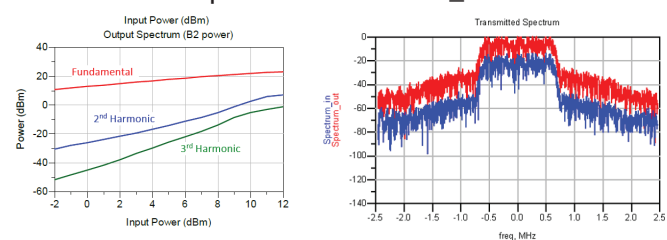
Amplifier X-Parameter models offer broadband noise and S-parameter prediction in Model_mode=0



[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.

X-Parameters Simulation

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



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

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.
- Request FREE* downloads of Mini-Circuits simulation models:

www.Modelithics.com/MVP/Mini-Circuits

*with approval