Modelithics®

World's Best RF & Microwave Simulation Models

Custom Measurement & Modeling Services

Modelithics Capabilities

- **Characterization Services**
  - S-Parameters
  - Noise
  - Load/Source-Pull
  - CW and Pulsed I-V
  - ESR & Impedance
- **Custom Modeling Services**
  - Passive Devices
  - Active Devices
  - GaN Modeling
  - 3D Modeling
  - X-Parameters*
- **Consulting**

*X-parameters is a registered trademark of Keysight Technologies in the US, EU, JP, and elsewhere. The X-parameters format and underlying equations are open and documented. For more information, visit Keysight X-Parameters Information.

Modelithics is the industry leader in providing high quality custom modeling and measurement services for RF, microwave and millimeter-wave electronic devices. Since 2001, Modelithics has provided precision measurement and modeling services with unmatched accuracy including a broad array of highest quality, RF/microwave/mm-wave characterization services. We also specialize in utilizing precision characterization data to develop equivalent circuit, black-box, and 3D EM models for linear and non-linear devices.

Linear, bias-dependent small signal, noise and/or non-linear models can be customized for components and devices in chip or packaged format. Models for active and passive surface-mount components are generated using standard or application specific test fixtures to ensure accuracy in the user's design environment.

All models are provided with complete documentation pertaining to the measurement conditions, model-to-measurement comparisons, and typical range of validity. Modelithics has a set a new high standard for excellence in RF/MW/mm-Wave model development and support.

Advanced Modeling Capabilities and Features

- Accurate Parasitic Handling
- Bias Dependence
- Broadband Validation
- Consistent Development
- Discrete Optimization
- ESR Validations
- Extensive Documentation
- Fixture/Reference Plane Details
- High Order Resonance Treatment
- High Power Design
- Include Pad Layouts
- Load Pull Validation
- Measurement Based
- Model Customization Services
- Multi-Simulator Compatibility
- Noise Analysis
- Non-Linear Active Device Models
- Orientation Selectable (Capacitors)
- Pad Size Scaling
- Part Value Optimization
- Part Value Scaling
- Part Value Selectable
- Professional Support & updates
- Statistical Analysis
- Substrate Scalable
- Temperature Dependence
- X-Parameters*

Devices: Accurate, measurement-driven models for a wide range of customer-specified devices and assemblies can be provided.

Amplifier	Attenuator	BJT / HBT	Capacitor	CMOS
Coupler	Diplexer	Duplexer	Equalizer	Ferrite Bead
Filters	GaAs PHEMT	GaN HEMT	HEMT	Inductor
Interconnects	JFET	Limiter	Low Noise FET	MESFET
Mixer	MOS / LDMOS	MOSFET	NPN BJT	Package
pHEMT	PIN Diode	Resistor	Resonator	Schottky
Splitter	Step Recovery Diode		Switch	Transformer
Triplexer	Varactor	Contact us for more details: Sales@Modelithics.com		

Supported Simulators

- Keysight PathWave ADS
- Keysight PathWave RF Synthesis (Genesys)
- Keysight PathWave System Design (SystemVue)
- Cadence® AWR Design Environment®
- Cadence® Spectre® RF Option
- Ansys® HFSS™
- Sonnet® Suites™

KEYSIGHT TECHNOLOGIES

cadence®

Ansys

SONNET®

Excellence in Modeling Since 2001

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Load Pull Measurements

Load- and source-pull measurements can be performed to generate impedance contours for optimizing the tradeoff between various amplifier performance parameters, such as output power and 1 dB compression, power-added efficiency (PAE), transducer gain, and third-order intermodulation distortion (IM3 or TOI).

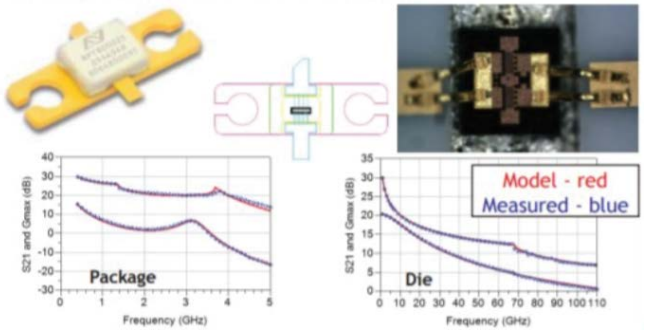
Customized bench options available.

Frequency Range	
Fundamental Tuning 0.2 to 50 GHz	
Fundamental Tuning 75 to 110 GHz	
Equipment	Harmonic Tuning to 0.915, 2.45, 5.25 GHz Fundamental
Maury Microwave	

GaN Modeling

Modelithics' non-linear GaN HEMT modeling service brings the trusted measurement and proven modeling expertise of Modelithics to the GaN technology area, where high accuracy, scalability and advanced model features are integral to the design process when using these devices.

Packaged and Die Device Modeling



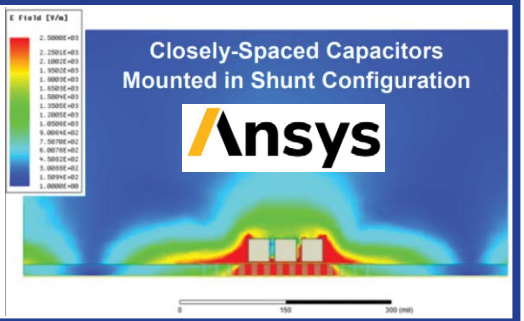
CW and Pulsed I-V:

DC and pulsed measurements are made using the following equipment:

Equipment	Capabilities
Accent DIVA	DC, Pulsed
AMCAD AM3200	DC, Pulsed
Auriga AU4750	Pulsed
HP4142 DC Moduluar DC Source/Monitor	DC

3D Modeling

Modelithics offers custom full wave 3D electromagnetic (EM) device modeling, developed based on the physical properties of each component. The models are formatted for use with the Ansys HFSS 3D environment and can simulate component interaction effects and the effects of parts placed in close proximity to other devices or objects.



Noise Measurements

Performed in a screen room to minimize local electromagnetic interference.

**Customized test bench*

Measurement	Frequency Range
Flicker Noise	10 Hz - 100kHz (1MHz)*
Noise Figure	10 MHz - 50 GHz (75 - 110 GHz)*
Noise Parameters	0.2 GHz - 50 GHz

Equivalent Series Resistance (ESR)

Equipment	Frequency Range
Bontoon Line	0.16 GHz - 1.6 GHz
Impedance/Network Analyzers	5 Hz - 3 GHz

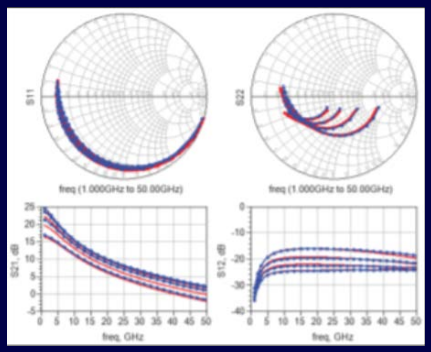
Temperature:
Capabilities from –50°C to +150°C

X-Parameters

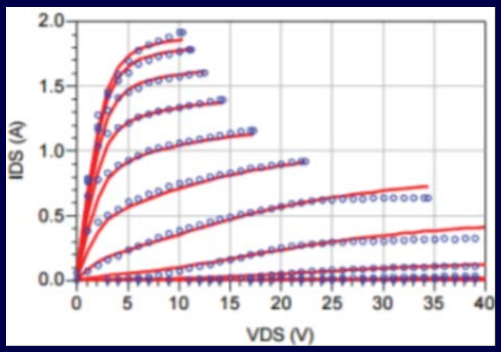
As a Keysight Technologies Solutions Partner, Modelithics offers custom non-linear X-Parameter measurements and X-Parameter model development.

KEYSIGHT TECHNOLOGIES

Bias-Dependent S-Parameters



I-V



S-Parameters

Multiple vector network analyzer (VNA) test platforms cover the following frequency bands:

Equipment	Frequency Range
2 Port VNAs HP & Keysight (Multiple)	5 Hz to 170 GHz
4 Port VNA Keysight PNA-X	10 MHz to 67 GHz

Many other measurements & tools are available. For more details, contact: sales@modelithics.com

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