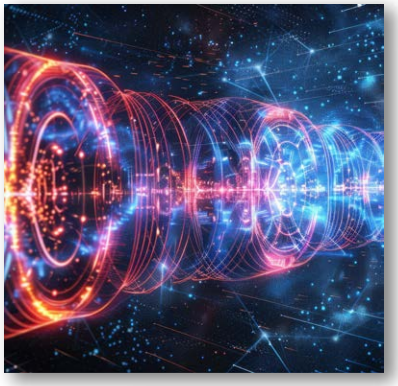
Modelithics®
Accelerating Your Design Success!

Modelithics® mmWave Library

Modelithics mmWave Library



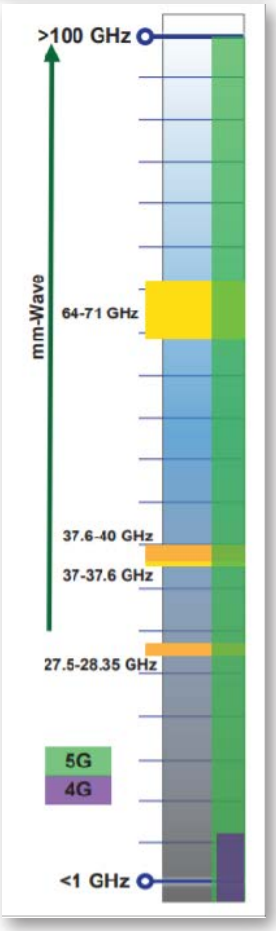
Overview

The **Modelithics mmWave Library** is a collection of models focused on supporting the next generation of cellular communication standards. All models in the mmWave Library are **validated to a minimum of 30 GHz, with some validated up to 125 GHz!** Modelithics models offer unique scalability features and parameter options to provide for advanced design analysis. They also capture real-world parasitics over broadband frequency ranges based on the specific design properties. These highly accurate and feature-rich simulation models are compatible with multiple popular electronic design automation (EDA) software tools.

Library Features

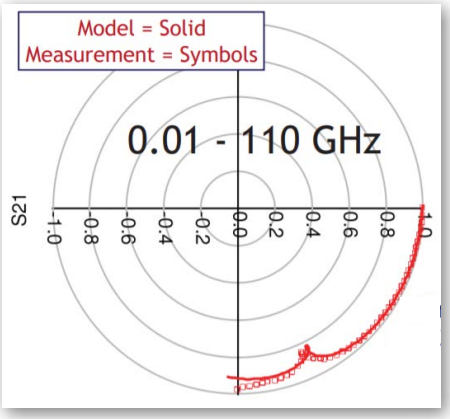
The Modelithics mmWave Library offers an extensive selection of models, representing thousands of components. The installed models are fully integrated with various electronic design automation (EDA) software. Modelithics mmWave Library also features a substrate library containing measurement-based substrate parameters for many of the most commonly used substrates.

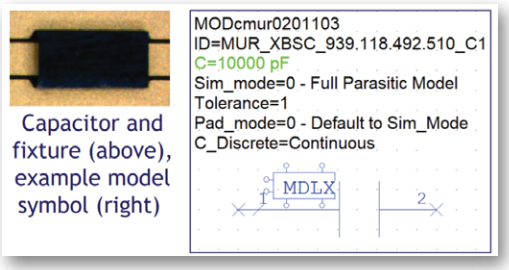
- **Measurement-based** — Each equivalent circuit model is developed using multiple specialized measurements under device-specific test conditions.
- **Scalability** — With the exception of a few ultra-broadband S-parameter models, passive resistor, capacitor and inductor models in the Modelithics mmWave Library are **Microwave Global Models™**, offering substrate, pad, and part-value scaling. Many capacitor models also offer selectable orientation. Active device models are non-linear and may include bias and/or temperature dependence.
- **Optimizable/Tunable** — Some model parameters, such as part value, can be set up for tuning or optimization to analyze and quickly reach design goals.
- **Compatible with Statistical Analysis** — Effects of component tolerance can be evaluated using the model tolerance parameter, and the models are compatible with Monte Carlo simulation tools for yield analysis.
- **Model Documentation** — Each model comes with a comprehensive model datasheet that lists recommended model validity parameters, test fixture and measurement details, and model-to-measured data plots.



Multiple EDA Tool Compatibility

The Modelithics mmWave Library includes a collection of models for discrete die, surface mount and packaged devices are a must-have for anyone involved in PCB-based RF & Microwave circuit or module design. The mmWave Library is available for use with Keysight Technologies' Advanced Design System (ADS), Cadence® AWR Design Environment®, Keysight Technologies' RF Synthesis (Genesys), Ansys® HFSS™, Sonnet® Suites™ and Cadence® Spectre® RF Option, and Keysight Technologies System Design (SystemVue).





Model vs. measured S21 (dB) of Murata Integrated Passive Solutions XBSC ultra broadband silicon capacitor (model CAP-MUR-0201M-103)

Literature Related to the Modelithics mmWave Library

- White Paper: Designing mmWave Bias Tees with Accurate Component Models
- Blog Post: Microwave Supermodels Reach the mmWave Realm
- Blog Post: mmWave Amplifier Model Adapts to Many Tasks

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Example List of Components in the Modelithics® mmWave Library

Modelithics Vendor Partners (MVPs)

Amotech
CAPACITORS
A60L, A60S, A60Z, ABCUA50S02x104, ABCUC 101 0XX 473, ABCUC 161 0XX 103, ABCUC 16S 01X 104, ABCUC 10S 01X 224, ABCUC 252 01X 103, ABCUC0610XX104, ABCUC16S01X103

Analog Devices
AMPLIFIER
ADL8142

API Inmet
RESISTOR
ANC50-100W, ANC50-50W, NPC20-40S

Vishay Barry
PACKAGES
QFN3312-0520, QFN3312-0521, QFN3312-0522, QFN4420-0520, QFN4420-0521, QFN4420-0522, QFN4424-0520, QFN4424-0521, QFN4424-0522, QFN5532-050x, QFN6636-0520, QFN6636-0521, QFN6636-0522, QFN7744-0520, QFN7744-0521, QFN7744-0522, QFN8848-0520, QFN8848-0521, QFN8848-0522

CEL
LOW NOISE FET
CE3512K2

Coilcraft
INDUCTORS
0201DS, 0201HL, 0402AF, 0402DC, 0402DF, 0402HP, 0403HQ, 0603CT, 0603HL, 0805HP, 0805LS, BCL, BCR

Dalicap
CAPACITORS
DLC70A, DLC70B, DLC75D, DLC75P

Darfon
CAPACITOR
C0402NP0

Exxelia
CAPACITOR
SHF251xxx

Gowanda
INDUCTORS
C050FL, C050SMC, C100FL, C100SM, C100SMC, C225FL

IMS
ATTENUATORS
A-0402WA, A-0603, A-0805, IA3-0805QA, IMS1141, IMS2533, IMS2652

SPLITTERS
IPS2346-C, IPS2668-C, IPT-0402WA-C-U, IPT-0603WA-C, IPT-0805WA-C

RESISTORS
ND3-0402PW, NDX-0402WA, NDX-0505WA, NDX-1020EZW, RC3-0402PW, RC4-0302PW

Infineon
SCHOTTKY DIODES
BAS3010S-02LRH, BAS52-02V, BAT62-02V

Johanson
INDUCTORS
L-14C, L-14W

CAPACITORS
QCCF, QCCP, QCCT

Kemet
CAPACITORS
C0201, CBR01, CBR02, CBR04, CBR04_Auto, CBR05C, CBR06, CBR06-Auto, CBR08

KNOWLES
CAPACITORS
C04BL121X, C06BL, C06CF, C08BL102X, C08BL242X, H-Range (0402), H-Range (0805), Milli-cap, Opti-cap

KOA
RESISTORS
RK73H1F

Kyocera-AVX
INDUCTORS
Accu-L (L0201), Accu-L (L0402)

Kyocera-AVX (Cont'd)
CAPACITORS
02013A, 0201YC, 0201YD, 0805xU, 200A, 520L, 530L, 550W103, 550W104, 550Z, 550Z104, 550Z224, 560W104, 560Z104, 560Z224, 700A, Accu-P 0201, CU1005, CU131, GH01, GH04, GH06, KGM02xCG, KGM03xCG, KGM03xR5, KGM03xR7, KGM21xR7, KGQ05xCG, KGQ21xCG, MP01, U Series (0603), UBR0402

MACOM
SCHOTTKY DIODE
MA4E1317

VARACTOR DIODE
MAVR-011020

SPLITTER
MAPD-011062

TRANSFORMER
MABA-011125

Marki Microwave
MIXERS
MM1-1453HSM, MM2-0530HSM

MDT
PIN DIODE
MP6250-P2715

Microchip
VARATOR DIODE
MV3903-P2010

Microwave Technology
GaAs FET
MWT-11F, MWT-1F, MWT-3F, MWT-7, MWT-7F, MWT-9F

Mini-Circuits
AMPLIFIERS
AVA-183+, PGA-103+, PMA-5451+, PMA-5452+, PMA-5453+, PMA-5454+, PMA-5455+, PMA-5456+, PMA-545+, PMA2-133+, PMA2-33+, PMA2-43+, PMA3-83+, PSA4-5043+

Mini-Circuits (Cont'd)
ATTENUATORS
KAT, YAT-A

COUPLER
JR1BD+

SPLITTERS
EP2C+, EP2K+, EP2K1+, EP2KADG+, EP2W+, EP2W1+, EPQ133+

TRANSFORMERS
NCS1-422+, NCS2-83+

Murata
CAPACITORS
GJM022, GJM033, GQM033, GQM1555, GQM187, GRM0335C1E, UBSC 935 151 423 510, UBSC 935 151 424 610, UBSC 935 151 723 510, XBSC 941.000.012.003, XBSC 941.000.012.103

INDUCTORS
LQG15HS, LQP02HQ, LQP02HV, LQP02TN, LQP02TQ, LQP03HQ, LQW15AN-10, LQW15AN-80, LQW18AN-10, LQW18AN-80

Piconics
INDUCTORS
CCxxTxxK240G5-004, CCxxxTxxK240G5-C, MK Series

Passive Plus
CAPACITORS
01005BB-ultra-low-ESR, 0201BB104, 0603N-ultra-low-ESR, 0708N-ultra-low-ESR, 0805N-ultra-low-ESR, 1111N-ultra-low-ESR

RESISTORS
1209BB, 2010BB

Presidio
CAPACITORS
0402UPxxxA4T1C, 0603UP Ultra Porcelain, BB0201X7R103M, BB0402X7R104M, BB0502X7R104M

Qorvo
GaAs PHEMT
FPD750, QPD2018D, QPD2025D, QPD2040D, QPD2060D, QPD2080D, QPD2120D, QPD2160D, TGF2040

RJR
PACKAGE
QFN01

Samsung
CAPACITORS
CL02CxxxxxxA, CL02CxxxxxxG

RESISTORS
RC0402, RC1005

SkyWorks
SCHOTTKY DIODES
SMS7630-006LF, SMS7630-079

Smiths Interconnect
ATTENUATORS
AT5xxF, CA0505D, K2TVA, TS06xxF, TSX, TT9, WTVA, WTVA0x00N05, WTVA0x00N07

RESISTORS
CRxxxxD, CT0404ALN1WB1, CT0404ALN2WB1, CTH0603ALN1SMTF, CTxxxxD

SPLITTERS
RPD02-50EAF, RPD04-50EHF, WPD02-1525EBF, WPD02-1525UDF, WPD02-2535ECF, WPD03-1525EEF, WPD04-1525EFF, WPD04-2535EGF

SOTA
RESISTORS
S0202AF50R0FEB, S0303AF50R0FWB

Southwest Microwave
CONNECTORS
1092-01A-5, 1093-04A-5

Susumu
CHIP ATTENUATORS
ATS1005-FD, RFD0603P

Taiyo Yuden
CAPACITORS
EMK042 101, TVS042

INDUCTORS
HKQ0603S

TDK
CAPACITORS
C0402C0G, CGA1A2C0G, CGA1A2X7R, CGB1T3X5R0J104M

INDUCTORS
MHQ0402PSA, MHQ1005P, MLG0402Q, MLG0603P

Tecdia
CAPACITORS
CMSK280, CMSK40, CMSK90, HBC2R2KY20X10X5A02, HBCR22AY20X10X5A02

Virginia Diodes
SCHOTTKY DIODES
W-Band Single Anode, W-Band ZBD

Vishay
RESISTORS
CH02016, CH0402, CH0603, CRCW01005, CRCW1206, FC0402, FCHP, FCHP0402, FCHP0402xxxBGT, FCHP0402xxxBTT, MCS0402, MCT0603

CAPACITORS
VJ0402D, VJ0603D

Würth Elektronik
CAPACITORS
WCAP-CSMH (X7R), WCAP-CSRF (NP0)

INDUCTORS
WE-CAIR, WE-KI, WE-KI HC, WE-MK, WE-TCI

FERRITE BEADS
WE-CBA 0402 High Current, WE-CBA 0402 Wide Band, WE-CBA 0603 High Current

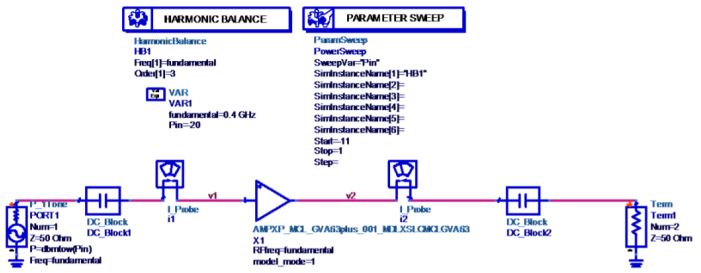
Yageo
CAPACITORS
AQ0402, AQ0603, CQ01005, CQ0201, CQ0402, CQ0603, CQ0805

RESISTORS
RC0100, RC0201

More to come! New models are added continually. Be sure to check out the models on the Modelithics Pre-Release List: www.Modelithics.com/Model/PreRelease

Available models may vary between simulators.

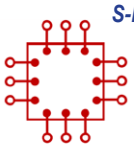
Example X-Parameters Simulation Schematic:



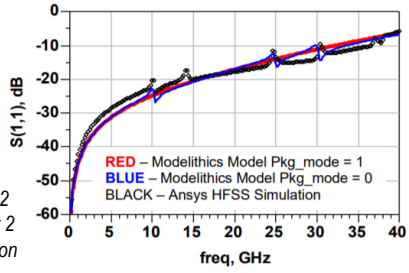
AMPXP-MCL-GVA63plus-001 for Mini-Circuits GVA-63+ Amplifier

PKG-BAI-QFN5532-001 for Barry QFN5532-050x Package

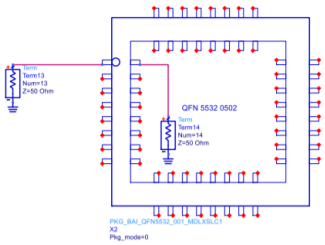
S-Parameter Performance - PORT # 1 to PORT # 2
(Package Corner Pin – Pin 1)

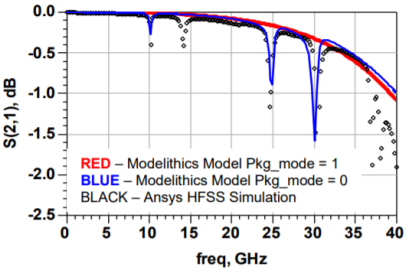


PKG-BAI-QFN5532-001
QFN-5532-050x
5 mm Package



Keysight ADS simulation of QFN-5532-0502 5 mm Package; Corner Pin – Port 1 to Port 2 (Corresponding to Package Pin 1) Simulation Compared to Ansys HFSS Simulation





Video: Modelithics COMPLETE Library Overview

Learn More About Modelithics' Library & Licensing Options

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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**!

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