

InfiniiMax Spice Models for the N5381A and N5382A Probe Heads

User's Guide



Agilent Technologies

Notices

© Agilent Technologies, Inc. 2005

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Agilent Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

01168-92002

Edition

First edition, April 2005

Printed in USA

Agilent Technologies, Inc.
1900 Garden of the Gods Road
Colorado Springs, CO 80907 USA

Warranty

The material contained in this document is provided “as is,” and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or sub-contract, Software is delivered and licensed as “Commercial computer software” as defined in DFAR 252.227-7014 (June 1995), or as a “commercial item” as defined in FAR 2.101(a) or as “Restricted computer software” as defined in FAR 52.227-19 (June 1987) or any equivalent

agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies’ standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

Input Impedance SPICE Models for InfiniiMax Series N5381A and N5382A Probe Heads

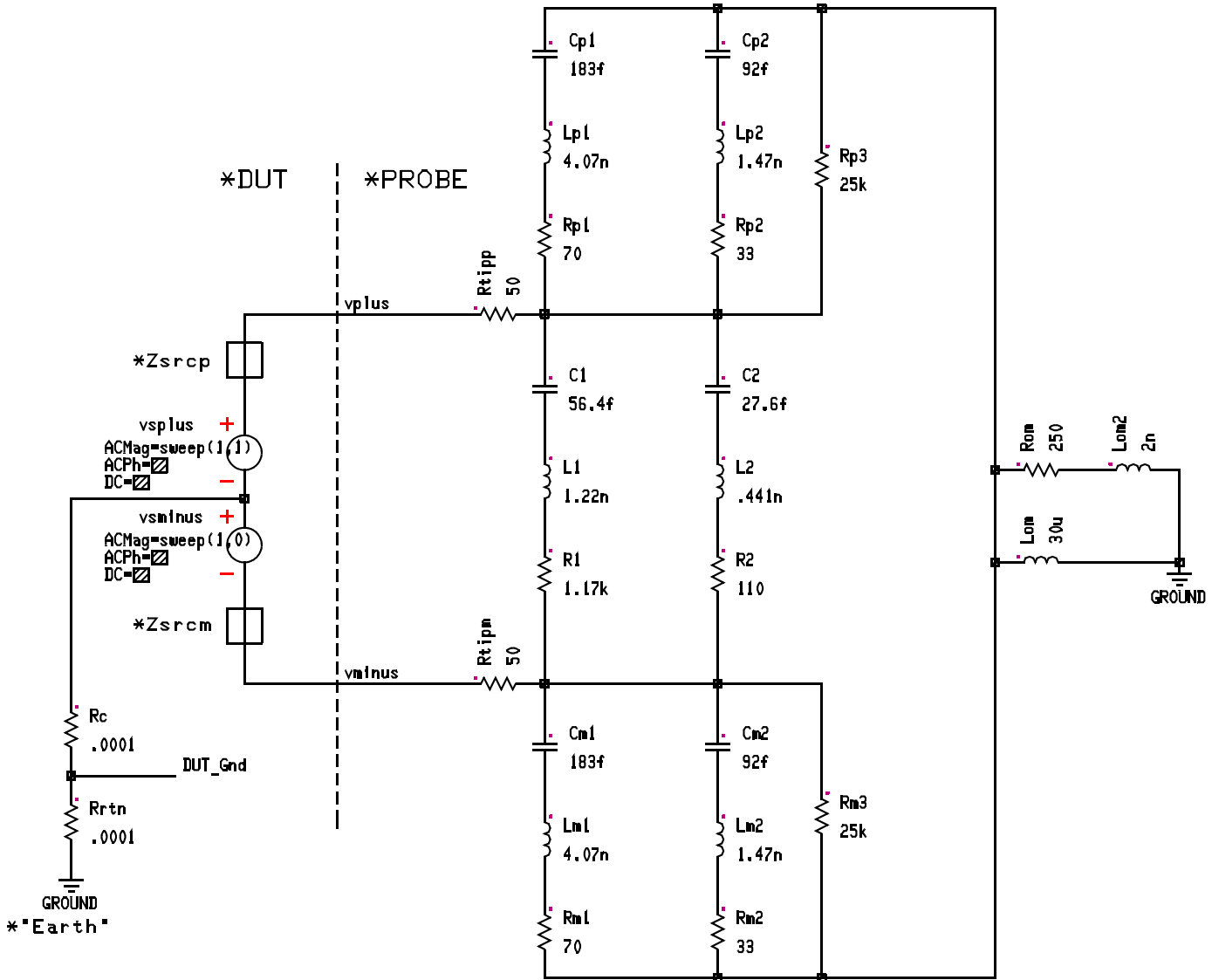
This document contains SPICE models that can be used to predict the probe loading effects of the InfiniiMax II active probes. Important points about these SPICE models are:

- ❑ SPICE models shown here are only for input impedance which allows modeling of the probe loading effects. Probe transfer function is generally flat to the specified BW.
- ❑ These input impedance is a function of the probe head type only. The probe amp bandwidth (10 GHz 1168A or 12 GHz 1169A) does not have any effect on the input impedance of the probe heads.
- ❑ The input loading models shown here are for the N5381A differential solder-in probe head and the N5382A differential browser probe head.

An input impedance plot is given that shows the matching of the measured data to the modeled data. Matching is generally very good up to the specified BW of the probe head.

Input Impedance SPICE Models for InfiniiMax Series N5381A and N5382A Probe Heads

*SPICE Model for InfiniiMax 1160 Series
*N5381A (&N5382A) Differential Probe Heads



- Rrtn (or Zrtn) is dependent on connection from DUT ground to "Earth" ground. Most likely modeled by a parallel RL similar to Rom || Lom. Will have slight effect on single-ended input Z and no effect on differential input Z.

If using diff probe to probe single-ended signals:

- vplus connected to DUT signal
- vminus connected to DUT ground which means that Rc = 0, vsminus = 0, and Zsrcm = 0.
- Input impedance is defined to be $vplus/i(vplus)$

If using diff probe to probe differential signals:

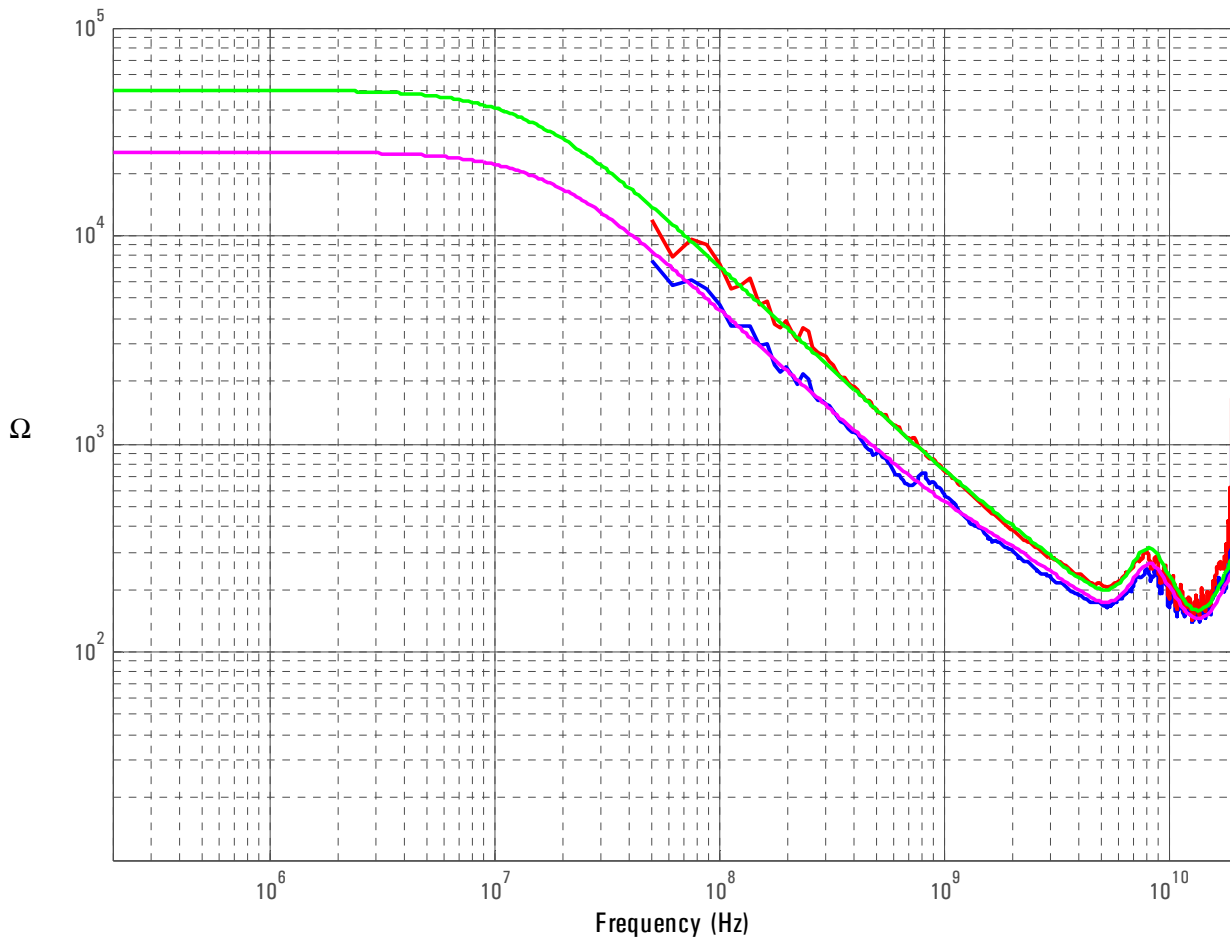
- Rc (or Zc) will depend on the DUT circuit.
- vplus connected to DUT plus signal
- vminus connected to DUT minus signal.
- Input impedance is defined to be $(vplus - vminus)/i(vplus)$

SPICE Deck and Measured/Modeled Data Matching For the
Differential Solder-in and Differential Browser Probe Heads

```
C2 %44 %40 27.6f
Cm2 %41 %38 92f
Cp2 %43 %36 92f
Cp1 %43 %34 183f
Cm1 %41 %31 183f
C1 %44 %28 56.4f
vsminus %16 %vminus ACMag=sweep(1,0)
vsplus %vplus %16 ACMag=sweep(1,1)
Lom2 %47 %0 2n
Lom %43 %0 30u
L2 %40 %39 .441n
Lm2 %38 %37 1.47n
Lp2 %36 %35 1.47n
Lp1 %34 %33 4.07n
Lm1 %31 %30 4.07n
L1 %28 %32 1.22n
Rm3 %41 %43 25k
Rp3 %43 %44 25k
Rom %43 %47 250
R2 %39 %41 110
Rm2 %37 %43 33
Rp2 %35 %44 33
Rp1 %33 %44 70
Rm1 %30 %43 70
R1 %32 %41 1.17k
Rtipm %vminus %41 50
Rtipp %vplus %44 50
Rrtn %15 %0 .0001
Rc %16 %15 .0001

.END
```

SPICE Deck and Measured/Modeled Data Matching For the Differential Solder-in and Differential Browser Probe Heads



Manual Part Number

01168-92002

