N2791A 25 MHz High-Voltage Differential Probe

User's Guide

For Safety, Regulatory, and publishing information, see the pages at the back of this book.

Agilent Technologies

Contents

Inspecting the Probe

❑ Inspect the shipping container for damage.

Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the probe has been checked mechanically and electrically.

❑ Check the accessories.

- If the contents are incomplete or damaged, notify your Agilent Technologies Sales Office.

❑ Inspect the instrument.

- If there is mechanical damage or defect, or if the probe does not operate properly or pass calibration tests, notify your Agilent Technologies Sales Office.
- If the shipping container is damaged, or the cushioning materials show signs of stress, notify the carrier as well as your Agilent Technologies Sales Office. Keep the shipping materials for the carrier's inspection. The Agilent Technologies office will arrange for repair or replacement at Agilent Technologies' option without waiting for claim settlement.

Cleaning the Probe

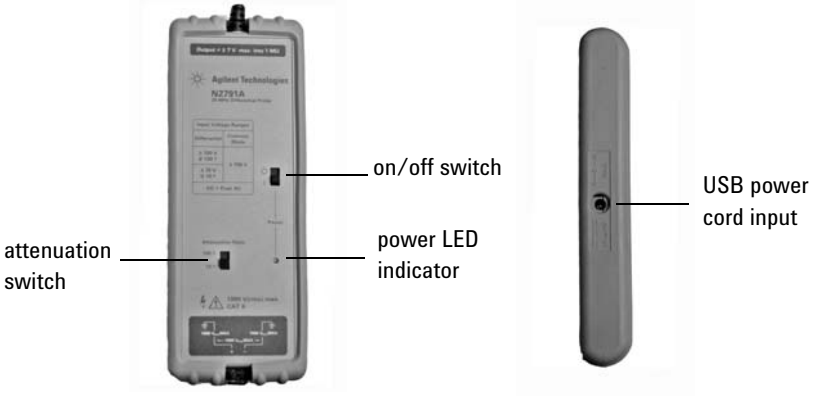
Disconnect the probe and clean it with a soft cloth. Make sure the probe is completely dry before reconnecting it to an oscilloscope. Avoid using abrasive cleaners and chemicals containing benzene or similar solvents.

Handling the Probe

Handle the probe with care and refer to the safety notices at the back of this manual and on page 8. Note that the probe cable is a sensitive part of the probe and, therefore, you should be careful not to damage it through excessive bending or pulling. You should also avoid any mechanical shocks to this product in order to guarantee accurate performance and protection.

N2791A High-Voltage Differential Probe

The N2791A high-voltage differential probe allows conventional earth-grounded oscilloscopes to be used for floating signal measurements up to 700 V of differential voltage and 700 V of common mode voltage. The N2791A offers users selectable attenuation settings of 10:1 and 100:1 which makes it highly versatile, allowing it to be used for a broad range of applications including power supply measurements and motor controls. This probe is compatible with any oscilloscope with a 1 MΩ BNC input. The probe can be powered by any USB port on an oscilloscope or computer, or by internal batteries (4x AA included with the probe).



Battery Use

- Insert 4 AA batteries in the back of the unit as indicated within the chassis (see page 9 for information on accessing the battery location)
- When battery life has expired, remove the batteries
- Note the WEEE label on the batteries and dispose of properly

Contents and Accessory Kit

The following table lists the parts included with the N2791A high-voltage differential probe.

Part	Quantity
N2791A 25 MHz differential probe	1
Safety Hook, Red	1
Safety Hook, Black	1
Alligator Clip, Red	1
Alligator Clip, Black	1
USB Power Cord (2 m)	1
AA Battery	4
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For replacement accessories, you can order the N2791-68700 Differential Probe Accessory Kit. It includes:

Part	Quantity
Safety Hook, Red	1
Safety Hook, Black	1
Alligator Clip, Red	1
Alligator Clip, Black	1
USB Power Cord (2 m)	1

Characteristics and Specifications

Characteristics and specifications for the N2791A high-voltage differential probe are shown below. The probe / oscilloscope should be warmed up for at least 20 minutes before any testing and the environmental conditions should not exceed the probe's specified limits.

Electrical Characteristics

Bandwidth (-3 dB)	>25 MHz (driving 1 MΩ oscilloscope input)
Attenuation ratio	10:1, 100:1 (switchable)
Probe Risetime (10%-90%)	14 ns
Absolute Maximum Rated Input Voltage (each side to ground)	1000 Vrms CAT II
Maximum Differential Input Voltage (DC + AC Peak)	±70 V at 1:10 attenuation ±700 V at 1:100 attenuation
Maximum Common Mode Input Voltage	±70 V at 1:10 attenuation ±700 V at 1:100 attenuation
Input Resistance	4 MΩ, 10 pF (each side to ground) 8 MΩ, 8 pF (between inputs)
Output Voltage Swing	±7 V (driving 1 MΩ oscilloscope input)
Offset (typical)	±7.5 mV
CMRR	-80 dB at 60 Hz, -40 dB at 1 MHz
Power Requirements	4 AA batteries or USB power adapter (5 V to 9 V, 90 mA)
Battery Life	15 hours (alkaline battery)
Battery/Power Cord	The supplied voltage must be less than 12 V and greater than 4.4 V or else the probe could be damaged

- all are typical

Mechanical Characteristics

Weight (probe only)	400 g (probe and PVC jacket)
BNC Cable Length	95 cm (37 inches)
Length of Input Leads	45 cm (18 inches)
Dimensions (L x W x H)	170 mm x 63 mm x 21 mm (6.7 inches x 2.5 inches x 0.83 inches)

Environmental Specifications	
Temperature	Operating: -10 °C to +40 °C
	Nonoperating: -30 °C to +70 °C
Altitude	Operating: 3,000 m
	Nonoperating: 15,300 m
Humidity	Operating: 25 - 85% room humidity Nonoperating: 25 - 85% room humidity
Pollution Degree	Pollution Degree 2

Safety Specifications
CEI/IEC 61010-031 CAT II

Safety Information

Warning

To avoid personal injury and to prevent fire or damage to this product or products connected to it, review and comply with the following safety precautions. Be aware that if you use this probe assembly in a manner not specified, the protection this product provides may be impaired.

Observe Maximum Working Voltage
To avoid injury, do not use the probe above 1000 Vrms CAT II between each input lead and earth or between the two input leads. This voltage rating applies to both the 1:10 attenuation setting and the 1:100 setting.

Must be Grounded
Before making connections to the input leads of this probe, ensure that the output BNC connector is attached to the BNC channel input of the oscilloscope and the oscilloscope is properly grounded.

Use Fused Test Prods if Necessary
If this probe is intended to be used with circuits of installation category II, it should incorporate the fused test prods.

Do Not Operate Without Covers
To avoid electrical shock or fire hazard, do not operate this probe with the covers removed.

Do Not Operate in Wet / Damp Conditions
To avoid electrical shock, do not operate this probe in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere
To avoid injury or fire hazard, do not operate this probe in an explosive atmosphere.

Avoid Exposed Circuit
To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

Use Proper Power Source
To ensure this probe functions well, use four AA batteries or the supplied USB power cord.

For Indoor Use Only
Only use this probe indoors.

Do Not Operate With Suspected Failures
If you suspect there is damage to this probe, have it inspected by a qualified service personnel.

Using the N2791A High-Voltage Differential Probe

- To use this probe, first insert the four AA batteries into the probe or connect the USB power cord to the probe and a USB port (see page 4 to see where the USB power cord input is located on the probe).

To replace batteries, first slip off the cover

Then slide the battery cover off on the rear of the probe

- Then connect the BNC output connector to the channel input of the oscilloscope. The oscilloscope must have a ground referenced.

- Select the proper attenuation ratio (10:1 or 100:1) on the probe via the switch (see the picture on page 4) and **specify the attenuation and probe configuration on your oscilloscope**.

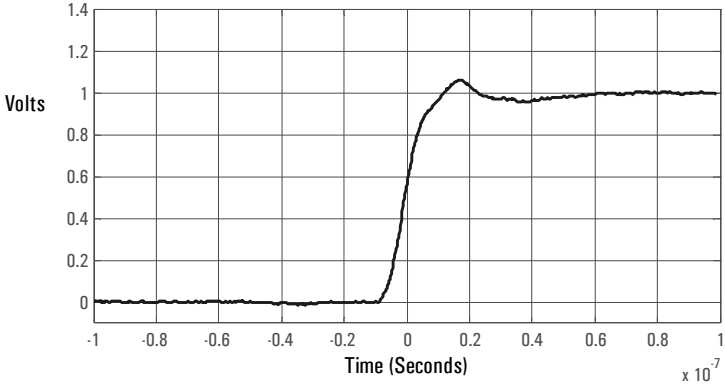
  TIP: When measuring signals below 70 V, switch the attenuation ratio to 10:1 in order to obtain a higher resolution signal with less noise. Otherwise set the attenuation ratio to 100:1.

- Using the appropriate probe accessories, connect the inputs to the circuit under test.

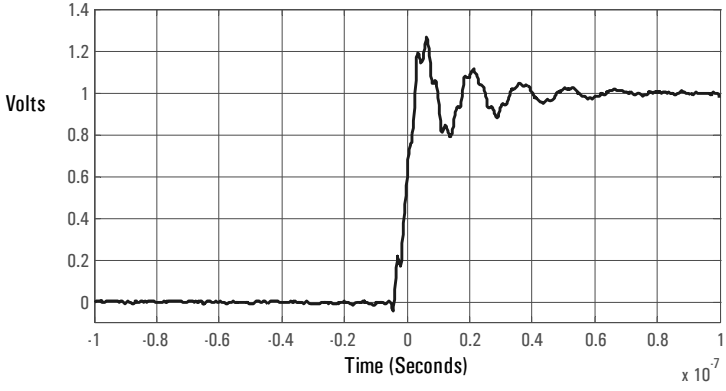
To protect against electrical shock, use only the accessories supplied with this probe or in the accessory kit.

This probe is to carry out differential measurements between two points on the circuit under test. This probe is not for electrically insulating the circuit under test and the measuring instrument.

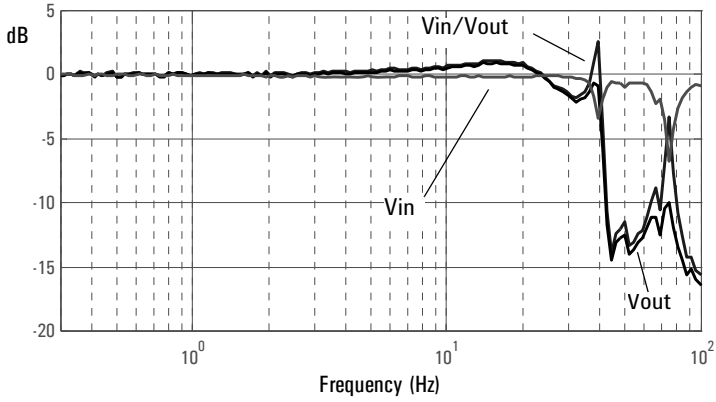
Plots



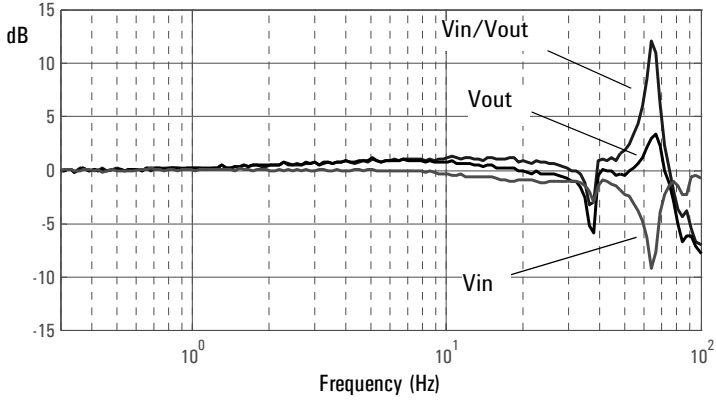
Graph of normalized step response (50Ω, 370 ps rising edge step generator), 10.4 ns normalized rising edge (10-90%), 10:1 attenuation



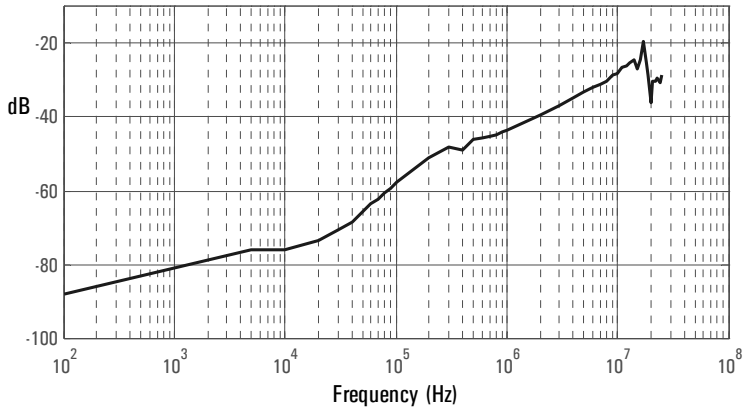
Graph of normalized step response (50Ω, 370 ps rising edge step generator), 6 ns normalized rising edge (10-90%), 100:1 attenuation



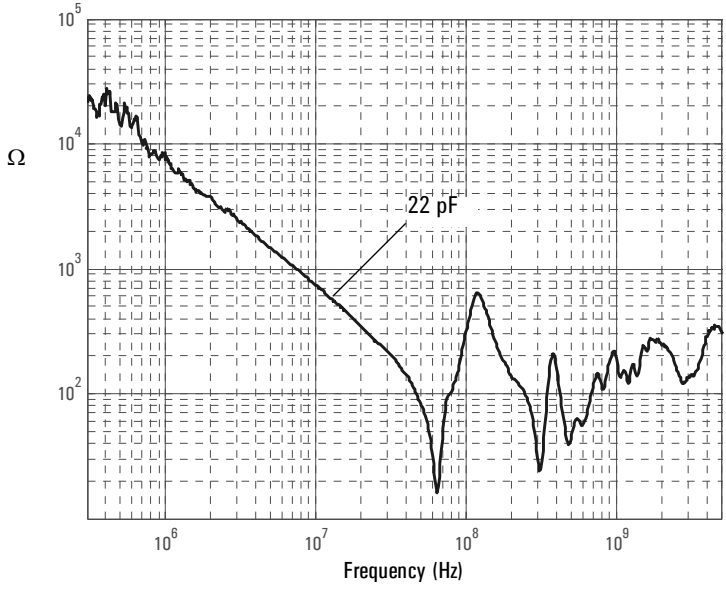
Graph of dB(Vin), dB(Vout) + 20dB, and dB(Vout/Vin) + 20dB frequency response, 10:1 attenuation



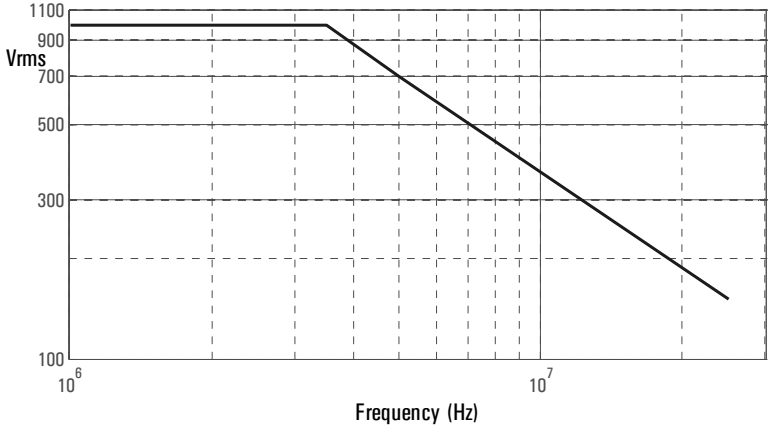
Graph of dB(Vin), dB(Vout) + 40dB, and dB(Vout/Vin) + 40dB frequency response, 100:1 attenuation



Graph of dB(Vout/Vin) + 20dB frequency response when inputs driven in common mode (common mode rejection), 10:1 attenuation



Magnitude plot of probe input impedance versus frequency (single-ended mode)



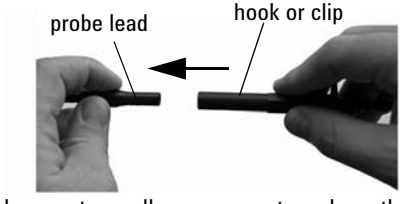
Derating plot

Using the Accessories

The following accessories are supplied with the N2791A probe and with the N2791-68700 Accessory Kit.

Safety Hook and Alligator Clips

These accessories can be pushed onto the probe leads as shown below.



Use the safety hooks to clamp onto smaller components and use the alligator clips to clamp onto thicker gauge devices

safety hook

alligator clip

夹层转换板分析仪示波器探头 INTERPOSER/ANALYZER/OSCILLOSCOPE PROBE						
部件名称 Part Name	有毒有害物质或元素 Toxic or Hazardous Substances and Elements					
	铅 Pb	汞 Hg	镉 Cd	六价铬 CrVI	多溴联苯 PBB	多溴二苯醚 PBDE
金属扣件 Metal fasteners	O	O	O	X	O	O
连接器 Connectors	X	O	O	X	O	O
印制电路板 Printed circuit assemblies	X	O	X	O	O	O
电缆 Cables	X	O	O	O	O	O
机械部件 Machined parts	X	O	O	O	O	O
其它部件 Other parts	O	O	O	O	O	O

O：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X：表示该有毒有害物质至少在该部件某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

如果上述表单多于一个，请参考您的订单或者装箱单从上述表格中找到适合您的产品的列表。

If more than one table is shown above, reference your order or packing list to determine which is applicable to your product.

若您需要了解有关本产品的生产日期信息，请联系您的安捷伦销售代表。

If you have a question about the manufacturing date for your product, ask your Agilent representative

有关如何与安捷伦联系的信息，请参考产品使用手册。

For Agilent contact information, please reference your product manual.

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Revision: G

Safety Notices

This apparatus has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Measuring Apparatus, and has been supplied in a safe condition. This is a Safety Class I instrument (provided with terminal for protective earthing). Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument that are described under "Safety Symbols."

Warnings

• Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.

• Service instructions are for trained service personnel. To avoid dangerous electric shock, do not perform any service unless qualified to do so. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

• Do not install substitute parts or perform any unauthorized modification to the instrument.

• Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.

• Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

• Do not use the instrument in a manner not specified by the manufacturer.

Safety Symbols

Instruction manual symbol: the product is marked with this symbol when it is necessary for you to refer to the instruction manual in order to protect against damage to the product or personal injury.

Hazardous voltage symbol.

Earth terminal symbol: Used to indicate a circuit common connected to grounded chassis.

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