

Keysight Technologies
N2804A and N2805A
High Voltage Differential Probes

Data Sheet

The N2804A and N2805A differential probes provide superior general-purpose differential signal measurements that are required for high-speed power measurements such as measuring characteristics of switching power devices, DC-DC converters or class D amplifiers, vehicle bus measurements, and high-speed digital system designs. Both probes are powered by the oscilloscope's AutoProbe interface.

Both probes allow conventional earth-grounded Keysight oscilloscopes to be used for safe floating signal measurements. Because of outstanding common mode rejection ratio of the probes across the full frequency ranges, probes allow measurement of small differential signal in the presence of much larger common mode signals typically found in power measurements.

The N2804A 300-MHz differential probe offers 100:1 attenuation ratio, allowing it to be used adequately for high voltage signal measurements. The differential probe has a differential input resistance of 4 M Ω and low input capacitance of 4 pF to minimize circuit loading. The probe comes with a pair of extension leads (30 cm long) with a damping resistor built in to damp out the in-band resonance and provide flat frequency response even while using the extension leads and probe tip accessories.

The N2805A is a 200-MHz differential probe designed to provide superior differential signal measurements with long cable length (5 m), making it ideal in an environment where extended cable length is required. This probe comes with an extensive set of probe tip accessories for use with small and large components in tight spaces.



Figure 1. N2804A 300-MHz differential probe with standard accessories.



Figure 2. N2805A 200-MHz differential probe with standard accessories.

Product number	N2804A	N2805A
Bandwidth ¹ (-3 dB)	300 MHz (without extension leads) 120 MHz (with extension leads)	200 MHz
Rise time (calculated, 0.35/Tr, 10 to 90%)	1.167 ns	1.75 ns
Attenuation	100:1	50:1
DC gain accuracy ¹ (% of reading)	± 1%	± 1%
Input R//C (each side to ground)	2 MΩ//3 pF	2 MΩ//8 pF
Input R//C (between inputs)	4 MΩ//1.5 pF	4 MΩ//4 pF
Max differential operating voltage	± 300 V (DC+ peak AC) and ± 200 Vrms	± 100 V (DC+ peak AC) and ± 100 Vrms
Max common mode operating voltage	± 300 V (DC+ peak AC) and ± 200 Vrms CATII ± 1000 V (DC+ peak AC) and ± 1000 Vrms (Main Isolated)	± 200 V (DC+ peak AC) and ± 200 Vrms CAT II ± 500 V (DC+ peak AC) and ± 500 Vrms (Main Isolated)
Max non-destructive voltage (each side to ground)	± 300 V (DC+ peak AC) and ± 200 Vrms CATII ± 1000 V (DC+ peak AC) and ± 1000 Vrm (Main Isolated)	± 300 V (DC+ peak AC) and ± 200 Vrms CATII ± 500 V (DC+ peak AC) and ± 500 Vrms (Main Isolated)
Probe noise (referred to probe input)	90 mVrms	30 mVrms
Output termination	50 Ω AutoProbe interface	50 Ω AutoProbe interface
Output offset (typical)	< ± 2 mV (adjustable)	< ± 2 mV (adjustable)
Adjustable offset range	-80 mV to + 80 mV or larger	-80 mV to + 80 mV or larger
CMRR (typical)	-80 dB at 60 Hz, -50 dB at 10 MHz	-80 dB at 60 Hz, -50 dB at 10 MHz
Temperature – operating	-10 to 40 °C	-10 to 40 °C
Temperature – non-operating	-30 to 71 °C	-30 to 71 °C
Humidity – operating	25 to 85% RH	25 to 85% RH
Humidity – non-operating	25 to 85% RH	25 to 85% RH
Altitude – operating	3,000 m	3,000 m
Altitude – non-operating	15,300 m	15,300 m
Length of BNC cable	1.2 m	5 m
Probe input lead	Φ2 mm, 12 cm without extension leads 39 cm with extension leads	Φ4 mm, 16.5 cm
Dimension	111 mm x 22 mm x 14 mm	111 mm x 22 mm x 14 mm
Standard accessories	2 each alligator clips 2 each pincer clips 2 each extension leads (30 cm) 1 trimmer tool (for offset adjustment) 8 color-coded rings	2 each alligator clip 2 each hook clips 2 each pincer clips 2 each browser tips 1 trimmer tool (for offset adjustment) 8 color-coded rings
Safety specifications	IEC61010-031	IEC61010-031

1. Warranted specifications.

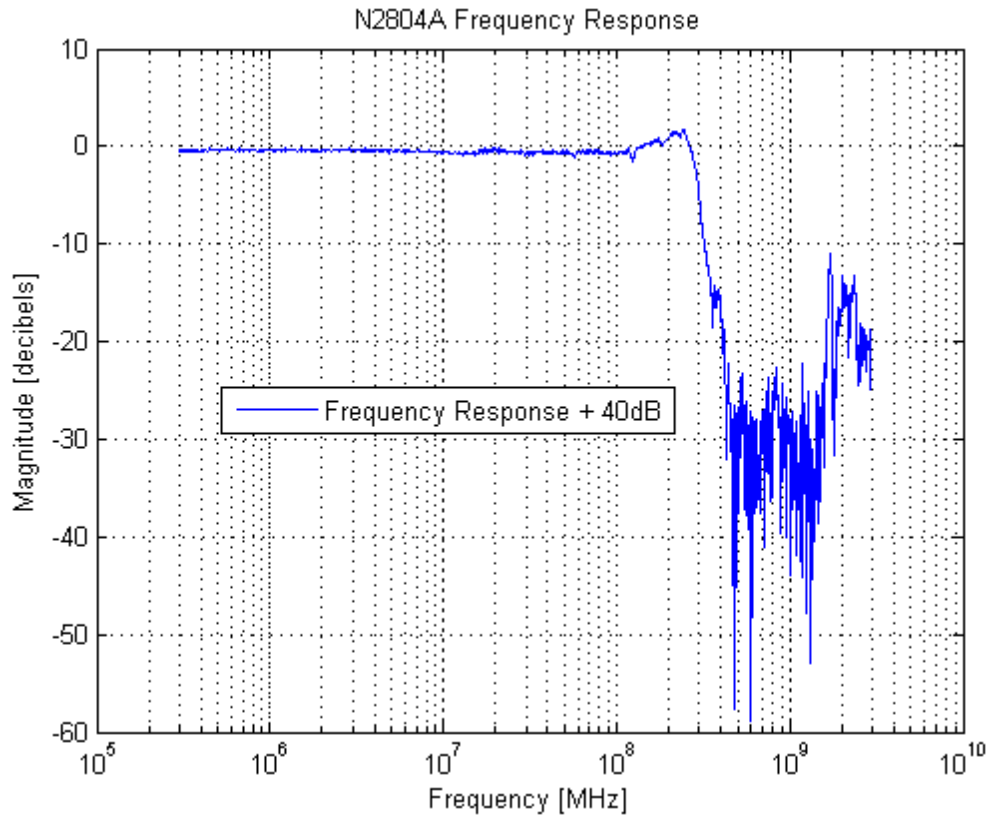


Figure 3. N2804A frequency response.

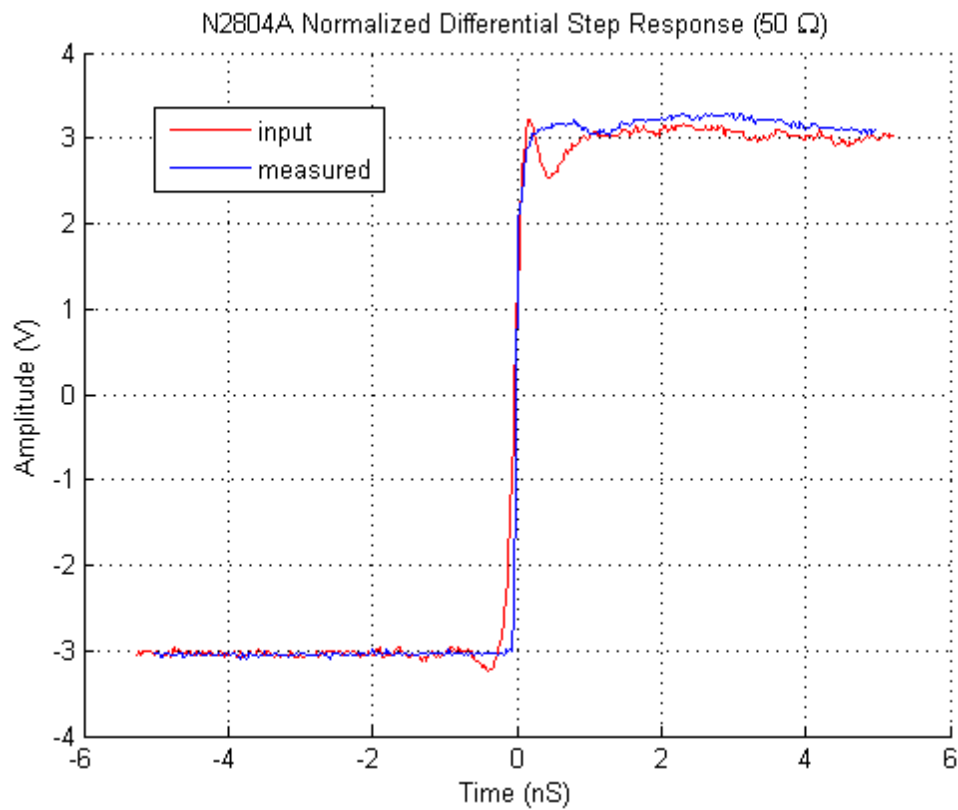


Figure 4. N2804A step response (normalized).

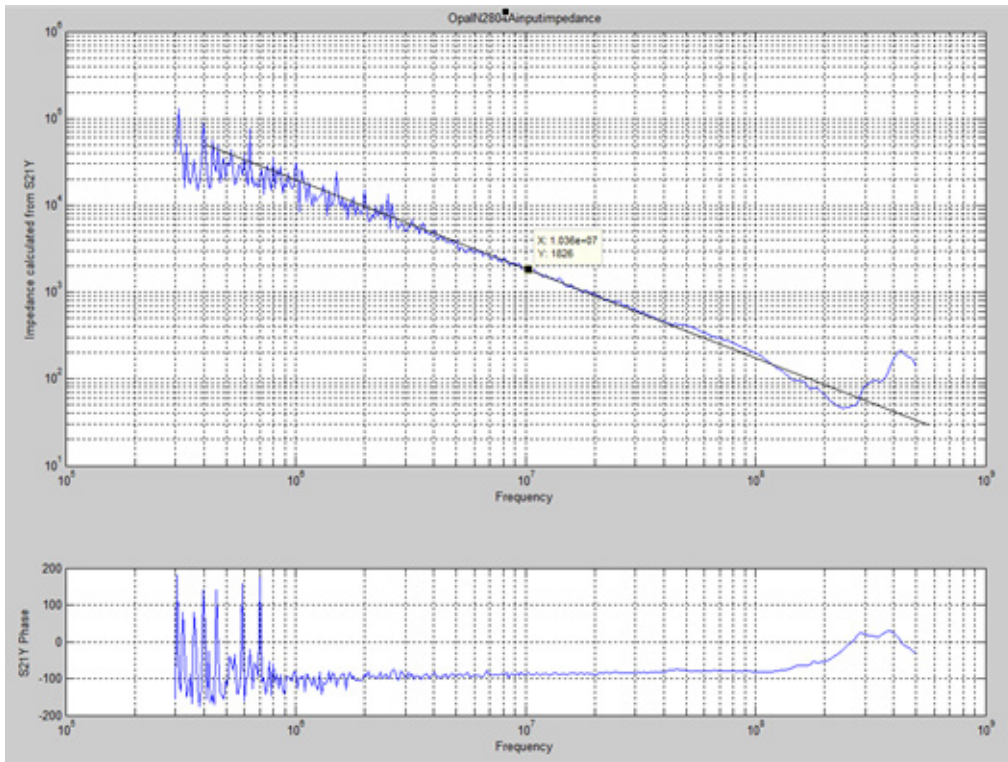


Figure 5. N2804A input impedance over frequency (between two inputs).

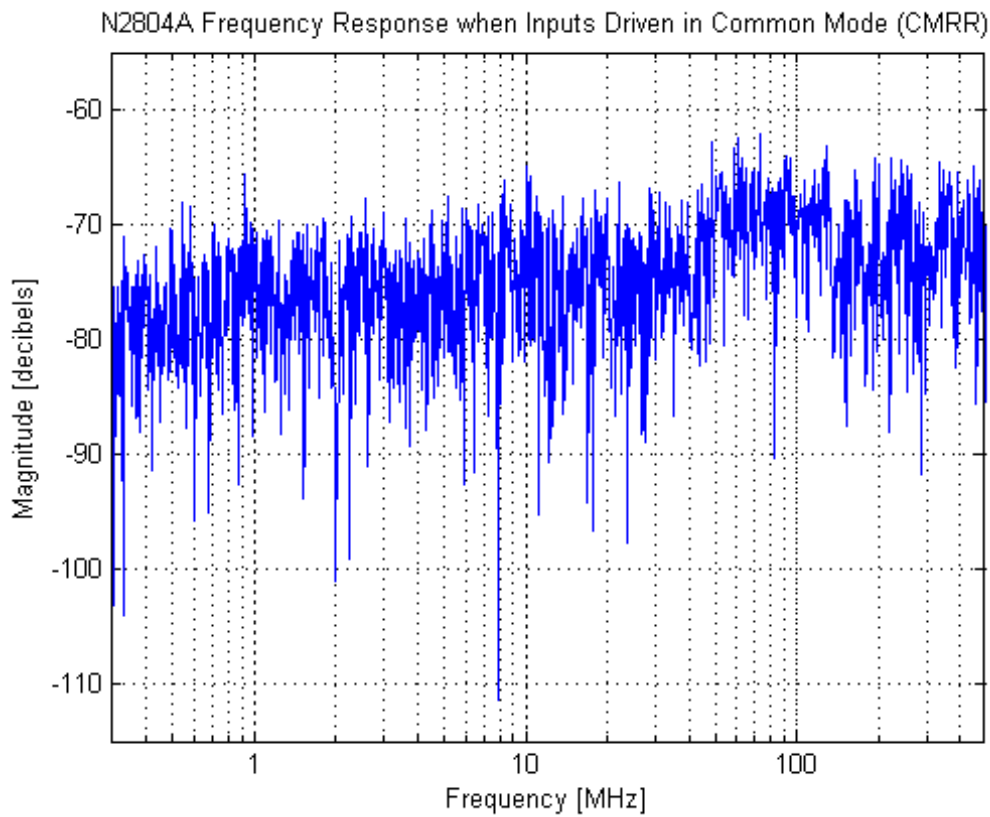


Figure 6. N2894A common mode rejection ratio,

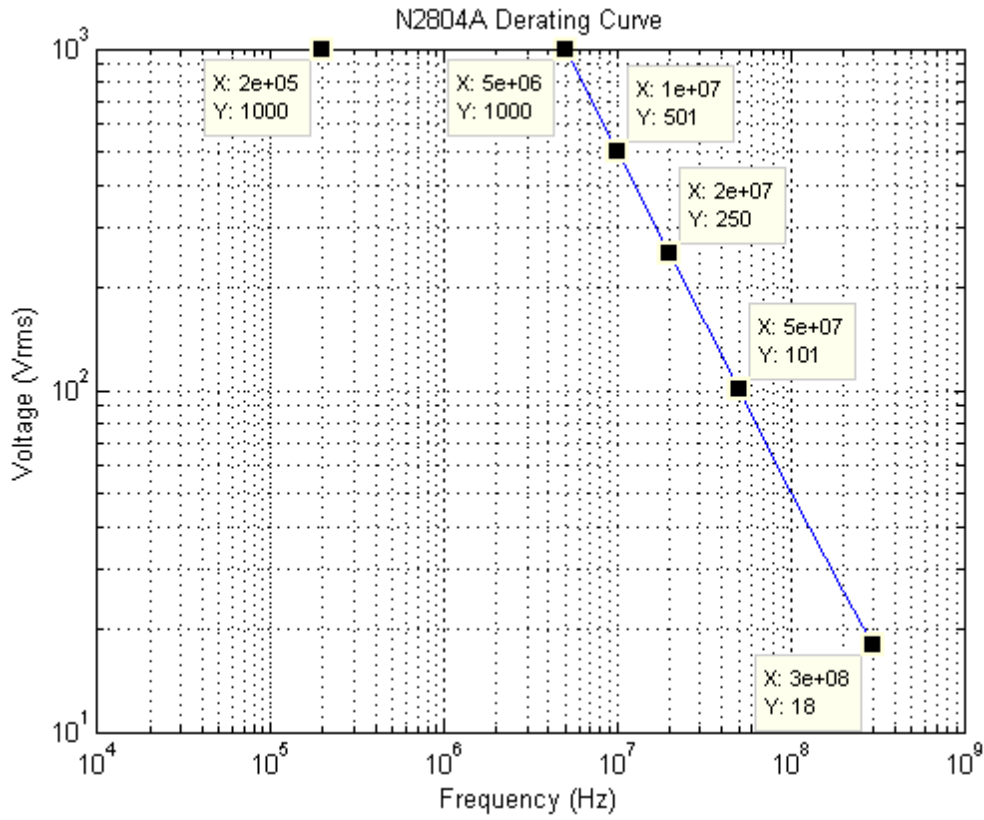


Figure 7. N2804A derating characteristics over frequency.

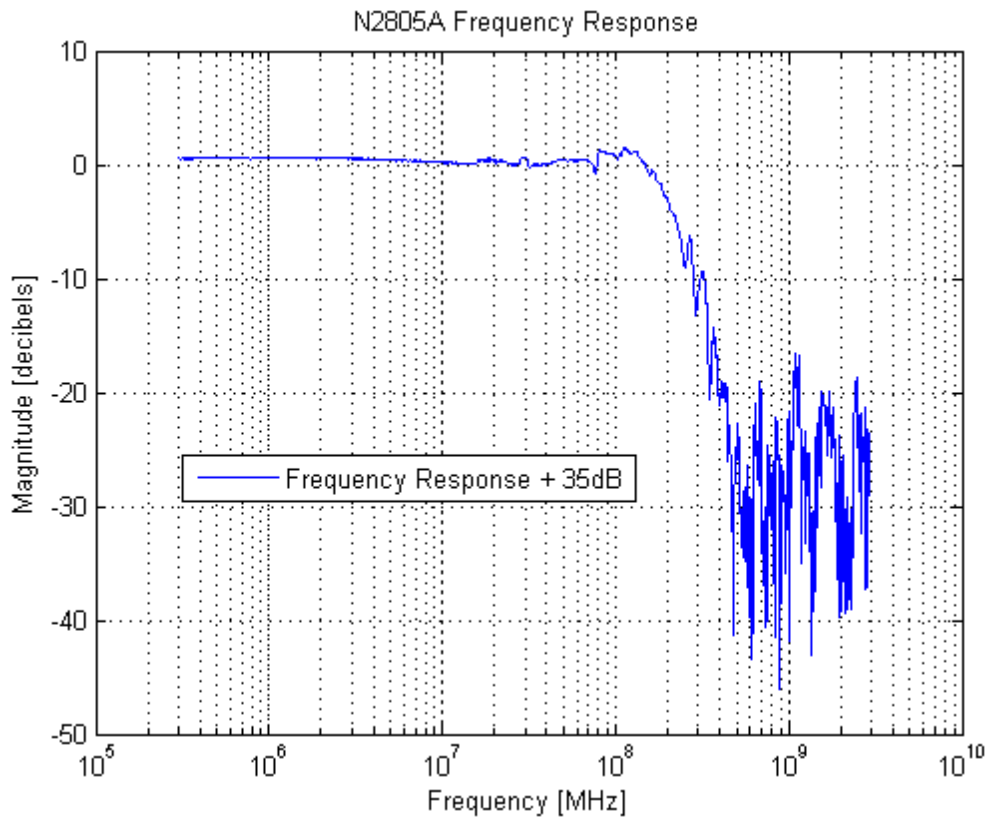


Figure 8. N2805A frequency response.

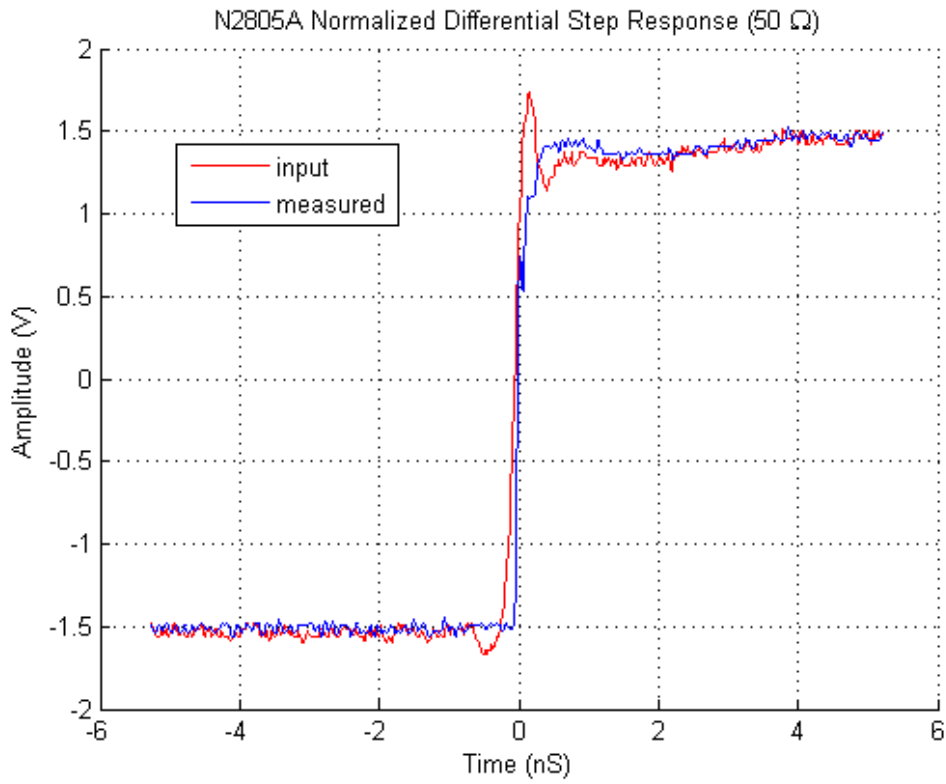


Figure 9. N2805A step response (normalized).

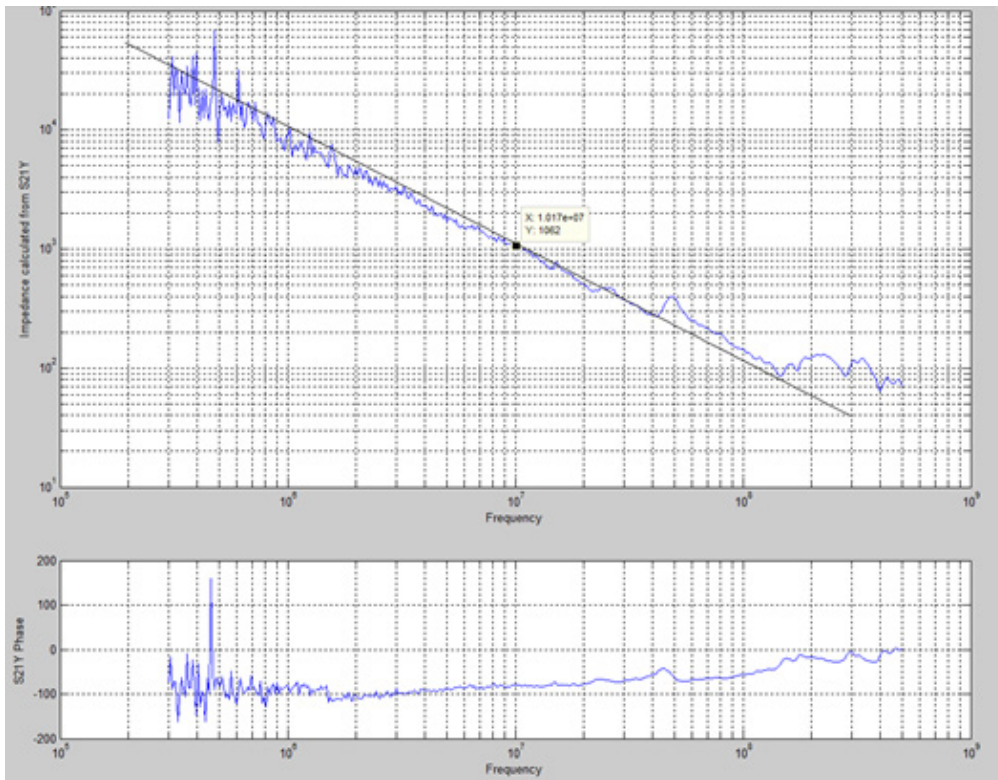


Figure 10. N2805A input impedance over frequency (between two inputs).

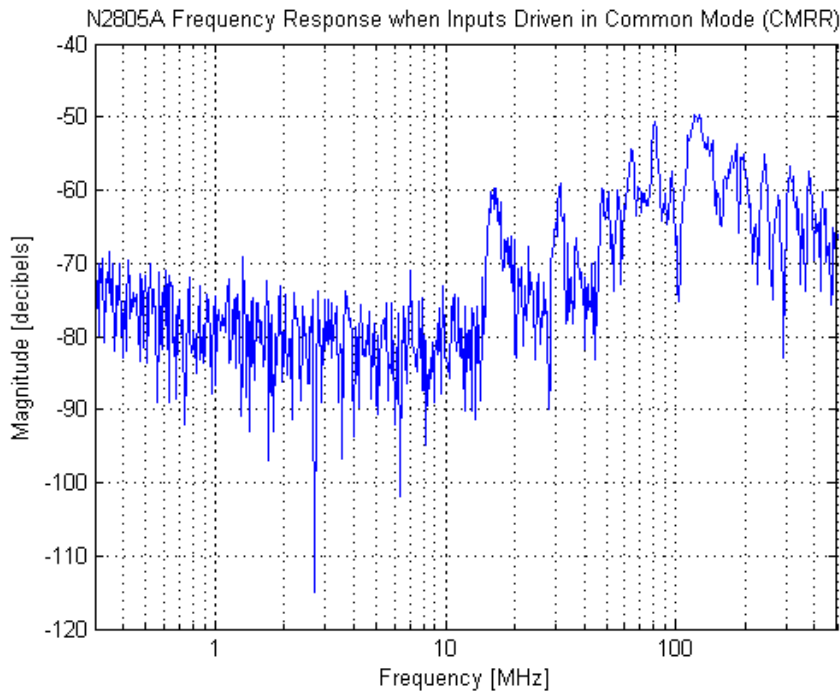


Figure 11. N2805A common mode rejection ratio.

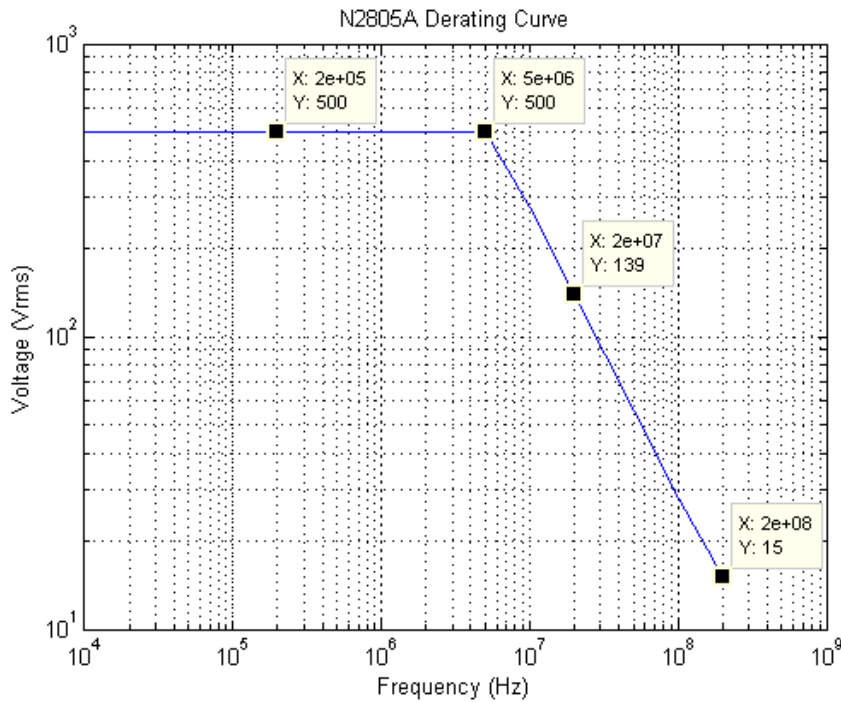


Figure 12. N2805A derating characteristics over frequency.

Ordering Information

Product number	Description
N2804A	300 MHz high voltage differential probe
N2805A	200 MHz high voltage differential probe with extended cable length
N2816A	Probe tip accessory kit for N2804A including 2 each alligator clips, 2 each pincer clips, and 1 extension leads (30 cm)
N2817A	Probe tip accessory kit for N2805A including 2 each alligator clips, 2 each hook clips, 2 each pincer clips, and 2 each browser tips
N7014A	Banana-to-socketed adapters (1 pair) for N2805A for connecting to 0.025" square pins (headers)



www.axistandard.org

AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. The business that became Keysight was a founding member of the AXIe consortium. ATCA®, AdvancedTCA®, and the ATCA logo are registered US trademarks of the PCI Industrial Computer Manufacturers Group.



www.lxistandard.org

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. The business that became Keysight was a founding member of the LXI consortium.

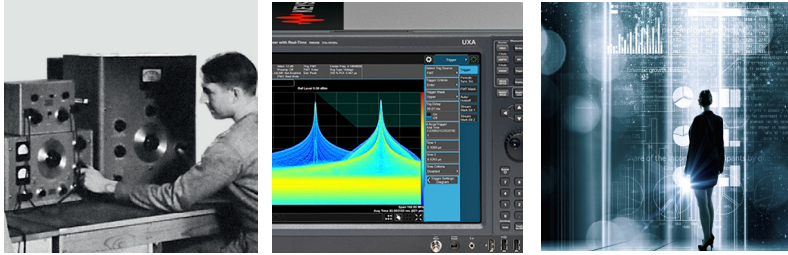


www.pxisa.org

PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Evolving Since 1939

Our unique combination of hardware, software, services, and people can help you reach your next breakthrough. We are unlocking the future of technology. From Hewlett-Packard to Agilent to Keysight.



For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 11 2626
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries: www.keysight.com/find/contactus (BP-9-7-17)

DEKRA Certified
ISO 9001 Quality Management System

www.keysight.com/go/quality
Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2015
Quality Management System

myKeysight

myKeysight

www.keysight.com/find/mykeysight

A personalized view into the information most relevant to you.

http://www.keysight.com/find/emt_product_registration

Register your products to get up-to-date product information and find warranty information.

KEYSIGHT SERVICES

Accelerate Technology Adoption.
Lower costs.

Keysight Services

www.keysight.com/find/service

Keysight Services can help from acquisition to renewal across your instrument's lifecycle. Our comprehensive service offerings—one-stop calibration, repair, asset management, technology refresh, consulting, training and more—helps you improve product quality and lower costs.



Keysight Assurance Plans

www.keysight.com/find/AssurancePlans

Up to ten years of protection and no budgetary surprises to ensure your instruments are operating to specification, so you can rely on accurate measurements.

Keysight Channel Partners

www.keysight.com/find/channelpartners

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.