DP003xA Series High Voltage Differential Active Probes

Introduction

Keysight Technologies' DP003xA Series of high-voltage, differential active probes provide superior general-purpose differential signal measurements required for high-speed power measurements such as measuring characteristics of switching power devices, DC-DC converters or class D amplifiers, automotive bus measurements, and high-speed digital system designs. As designs become more complex and the need for floating measurements grows, these differential probes enable floating measurements between any two points on a board and can also function as single-ended probes with one terminal connected to ground. The DP003xA Series differential active probes are available in bandwidth models ranging from 25 MHz to 200 MHz with a wide input dynamic range of up to ± 7000 V.



The DP003xA series probes are equipped with either Keysight Technologies' AutoProbe1 interface or a standard BNC interface. Probe models DP0031A/32A/33A/34A are designed with Keysight's AutoProbe1 interface, which provides power, offset calibration, and auto-configuration including attenuation settings without having to remove the probe from the scope or DUT.

KEYSIGHT

Model DP0030A contains a universal BNC interface and uses USB type A for power delivery to the probe which means it is compatible with any oscilloscope with 1 MΩ input impedance. It has a physical button to achieve switchable attenuation. The DP003xA series of probes are compatible with most of Keysight's InfiniiVision and Infiniium oscilloscopes that provide 1-MΩ input terminations with the AutoProbe1 interface. Select from the following models to meet your differential probing requirements:

	DP0030A	DP0031A	DP0032A	DP0033A	DP0034A
Bandwidth	100 MHz	200 MHz	200 MHz	200 MHz	70 MHz
Attenuation (high/low)	250/25:1	250/25:1	500/50:1	1000/100:1	2500/250:1
Max differential measurement range (DC + AC peak)	±750 / ±75 V	±750 / ±75 V	±1500 / ±150V	±3000 / ±300V	±7000 / ±700V
Oscilloscope interface	BNC + USB	AutoProbe1			

Probing Accessories

Keysight Technologies' DP003xA Series differential active probes come in a hard plastic carrying case and are supplied with the following standard accessories shown in Figure 1.



Figure 1. Standard probing accessories that come with each DP003xA Series differential active probe.

Two standalone kits that provide additional quantities of the above accessories are available for the DP0003xA probes. The table below shows the accessories included in each kit:

Part Number	Description	Qty.	DP0040A Advanced Accessory Kit	DP0041A Basic Accessory Kit
DP0040-68702	Extension lead set, 1 m	1	✓	✓
DP0040-68703	Jaws test clip set	1	✓	
DP0040-68704	Hook test clip set	1	✓	✓
DP0040-68705	Alligator test clip set, 3000V	1	✓	✓
DP0040-68706	Alligator test clip set, 7000V	1	✓	

Electrical Specifications and Characteristics

	DP0030A	DP0031A	DP0032A	DP0033A	DP0034A
Bandwidth (-3 dB) [1]	100 MHz	200 MHz	200 MHz	200 MHz	70 MHz
Attenuation ranges (high/low)[2]	250/25:1	250/25:1	500/50:1	1000/100:1	2500/250:1
Absolute maximum rated input voltage (each side to ground)[3] ⚠	300 Vrms CAT III 600 Vrms CAT II		600 Vrms CAT III		
Differential measurement range (DC + AC peak)[4]	±750 V	±750 V	±1500 V	±3000 V	±7000 V
Differential input resistance	5 MΩ // 2 pF	5 MΩ // 2 pF	10 MΩ // 2 pF	20 MΩ // 2 pF	50 MΩ // 2 pF
Common mode rejection ratio	DC: >80 dB 1 kHz: >50 dB 1 MHz: >40 dB 100 MHz: >20 dB		DC: >80 dB 1 kHz: >65 dB 1 MHz: >55 dB 100 MHz: >30 dB		DC: >80 dB 1 kHz: >65 dB 1 MHz: >55 dB 70 MHz: >30 dB
Gain accuracy[5]	<2%	<1%			
Noise referenced to input (probe only, high attenuation)	<50 mVrms	<50 mVrms	<150 mVrms	<250 mVrms	<300 mVrms
Noise referenced to input (probe only, low attenuation)	<20 mVrms	<20 mVrms	<30 mVrms	<50 mVrms	<60 mVrms
Differential offset	Oscilloscope offset only				
Offset error	N/A	±0.2% of range			
Offset drift	<100 uV/°C				
Output drive	1 MΩ				
Overload indication LED	No	Yes			

[1] Denotes warranted specification
[2] Actual attenuation setting determined during auto probe calibration for probe DP0031-34A. Attention is manually switched on DP0030A.
[3] Maximum rated input voltage applied to the probe and all probing accessories.
[4] Non-CAT (mains isolated)
[5] Denotes warranted specification

Mechanical and Environmental Characteristics

	DP0030A	DP0031A	DP0032A	DP0033A	DP0034A
Operating ambient temperature	0 to 55 °C				
Non-operating ambient temperature	-40 °C to +70 °C				
Operating humidity	Up to 95% RH @ 40 °C				
Non-operating humidity	Up to 90% RH @ 65 °C				
Operating altitude	2000 m				
Non-operating altitude	4,600 m				
Pollution Degree	2				
Approximate weight	0.44 kg	0.54 kg			0.63 kg
Output cable length	1.2 m	1.5 m			
Oscilloscope interface	BNC + USB	AutoProbe 1			

Performance Plots and Graphs (Typical)

Performance plots are based on using the DP003xA probe without probing accessories.

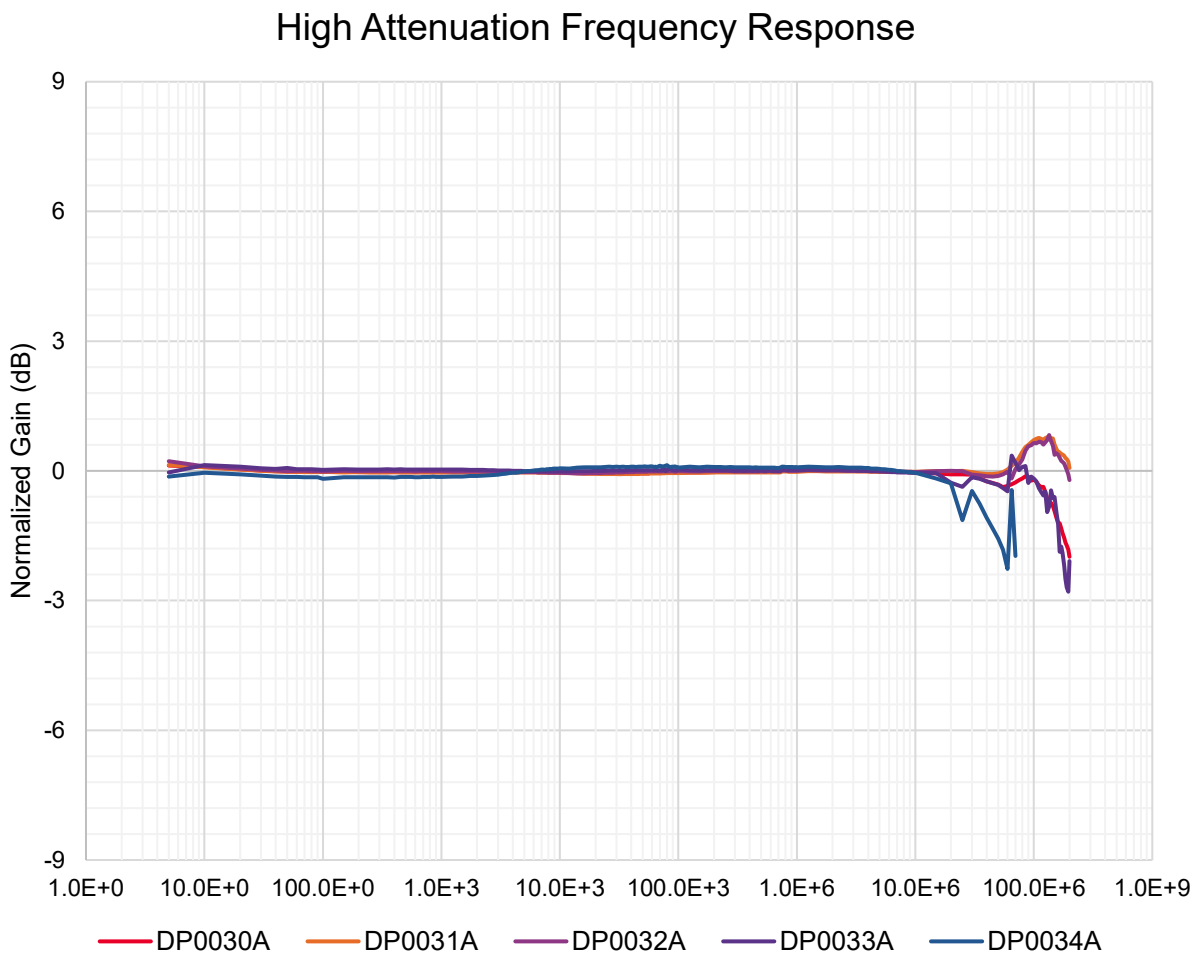


Figure 2. Vout/Vin frequency response of DP003xA probes on high attenuation settings.

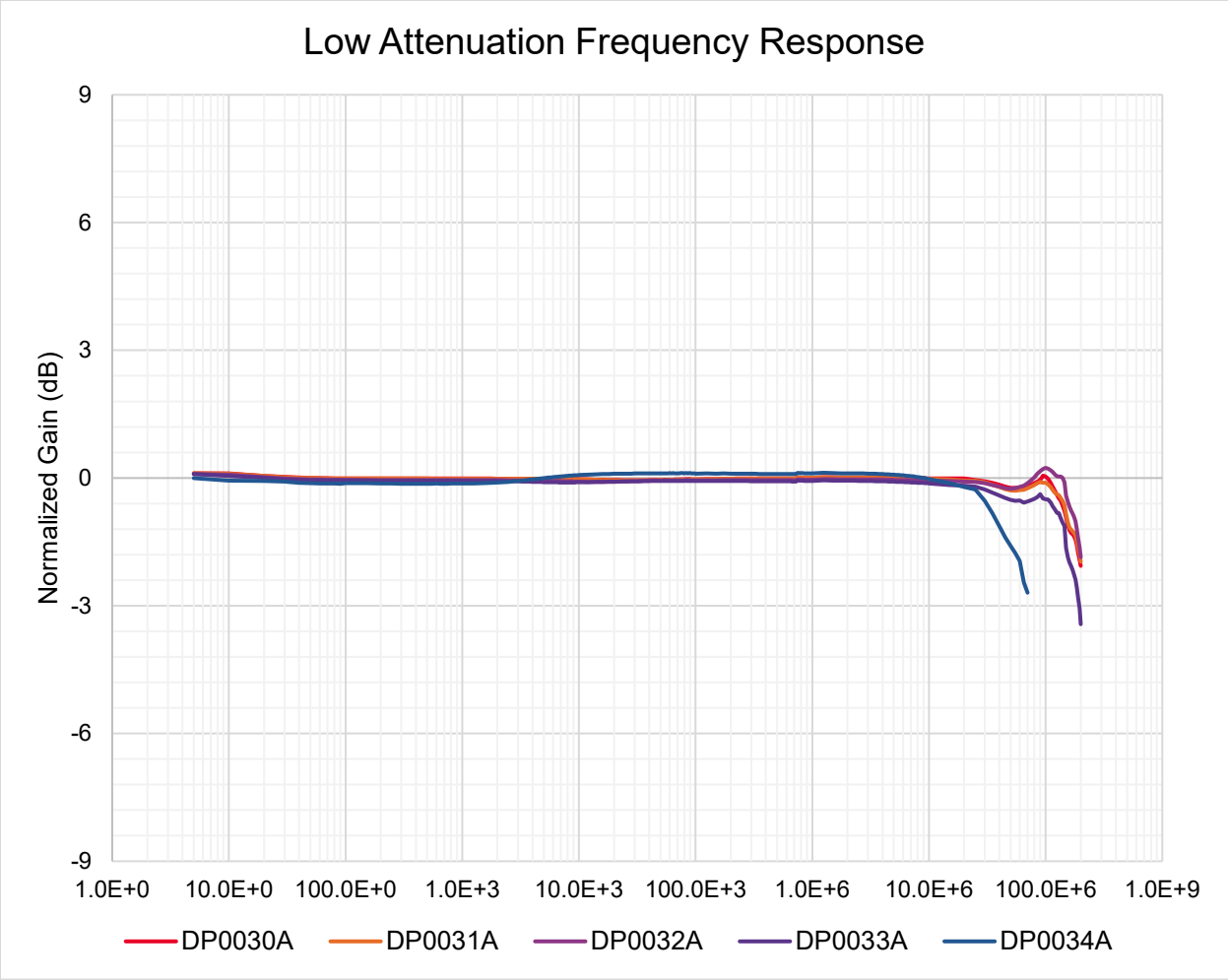


Figure 3. Vout/Vin frequency response of DP003xA probes on low attenuation settings.

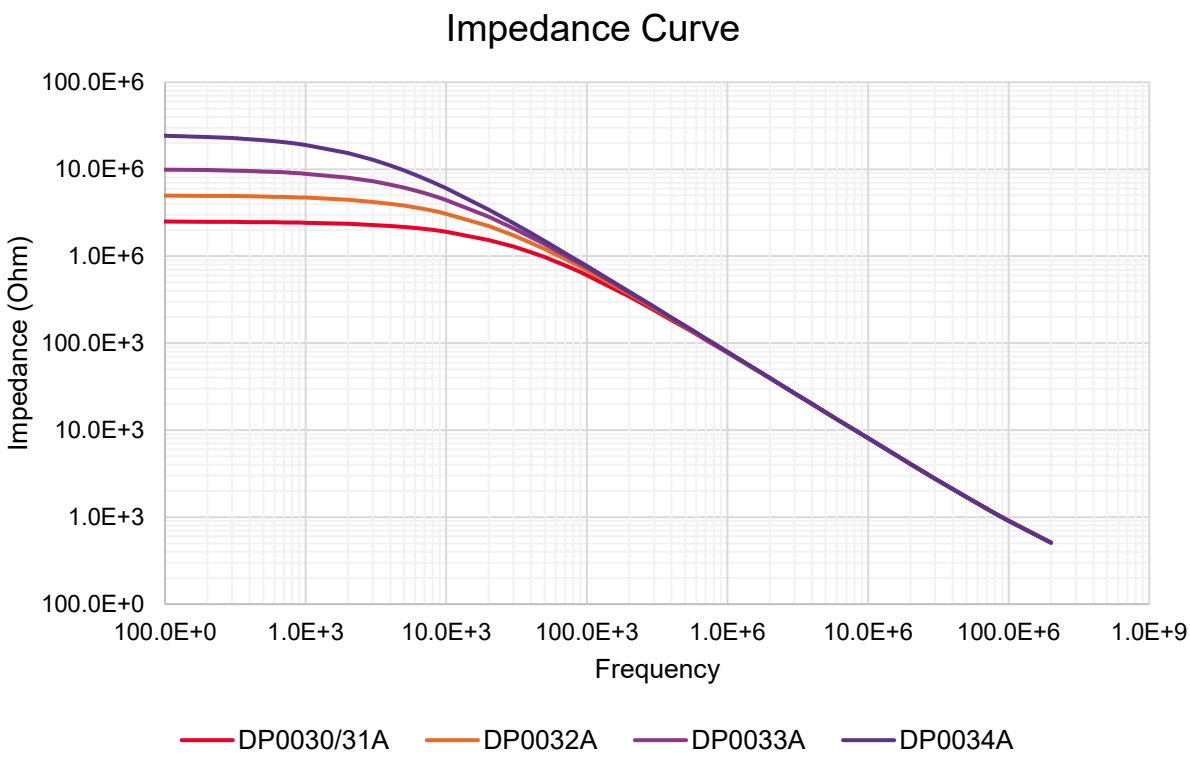


Figure 4. Input impedance vs frequency of the DP003xA Series probes.

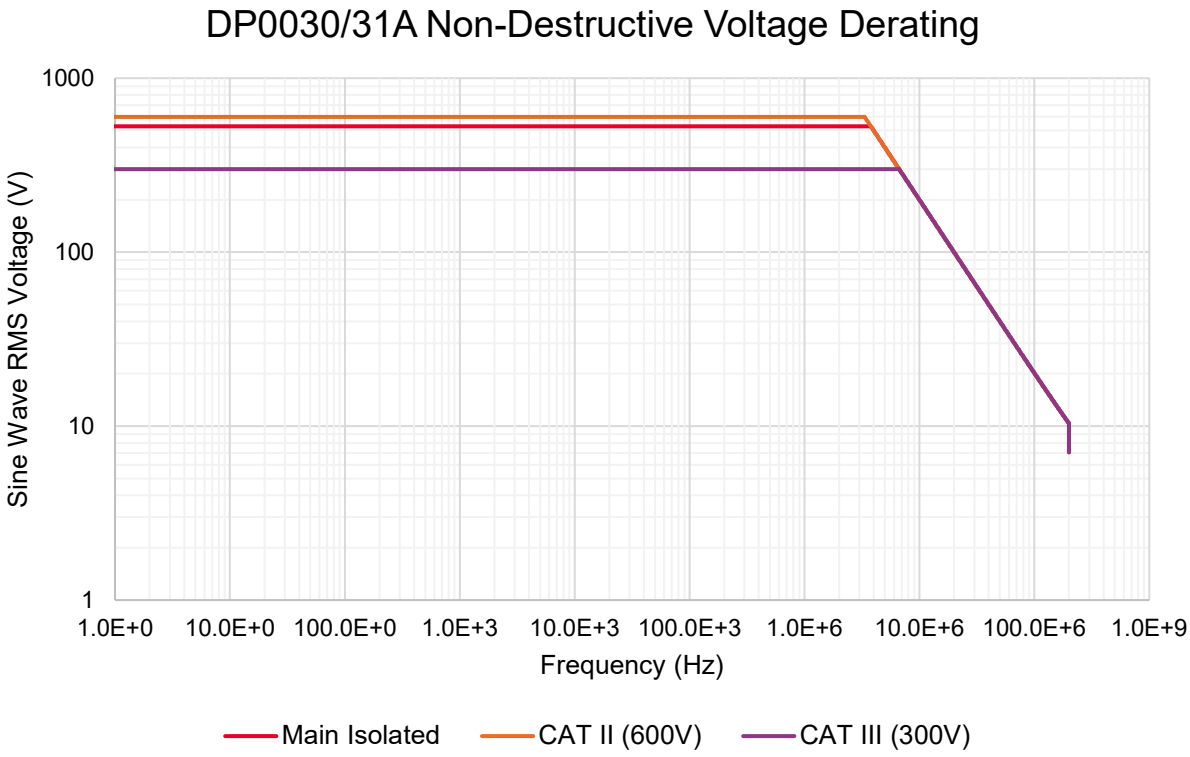


Figure 5. Voltage derating curve of the DP0030/31A probes (voltage between either input or ground).

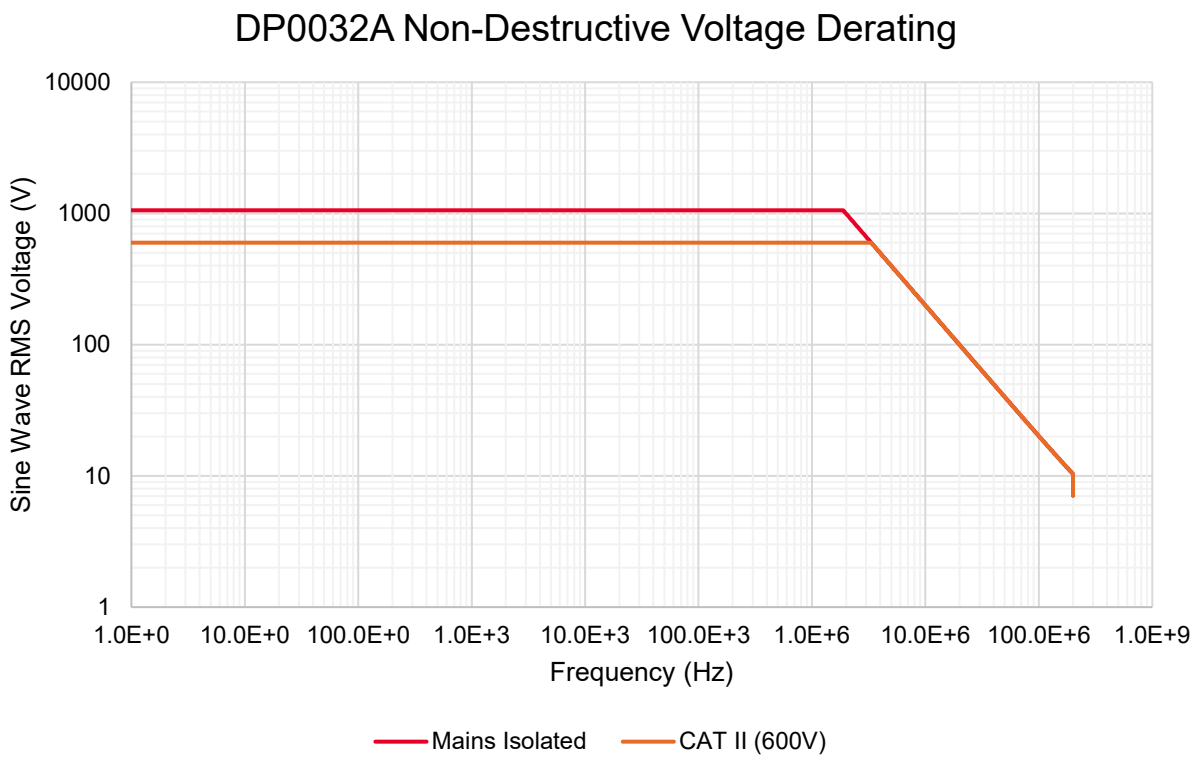


Figure 6. Voltage derating curve of the DP0032A probe (voltage between either input or ground).

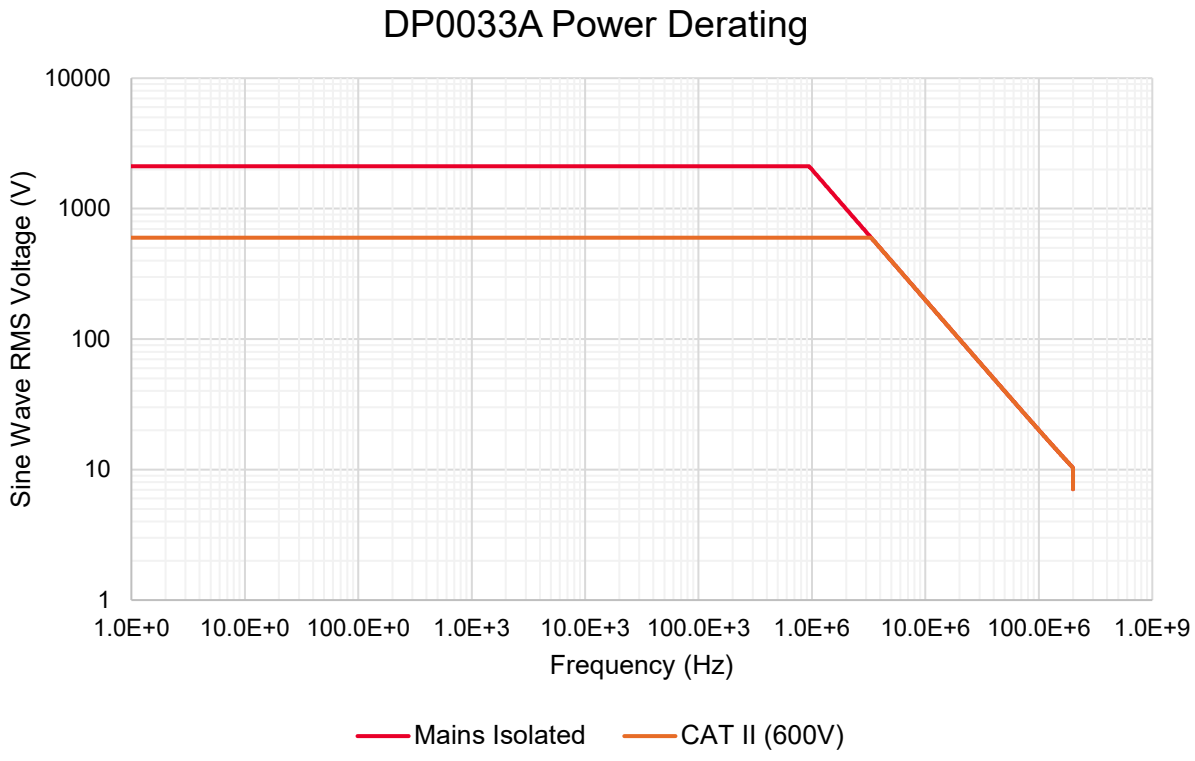


Figure 7. Voltage derating curve of the DP0033A probe (voltage between either input or ground).

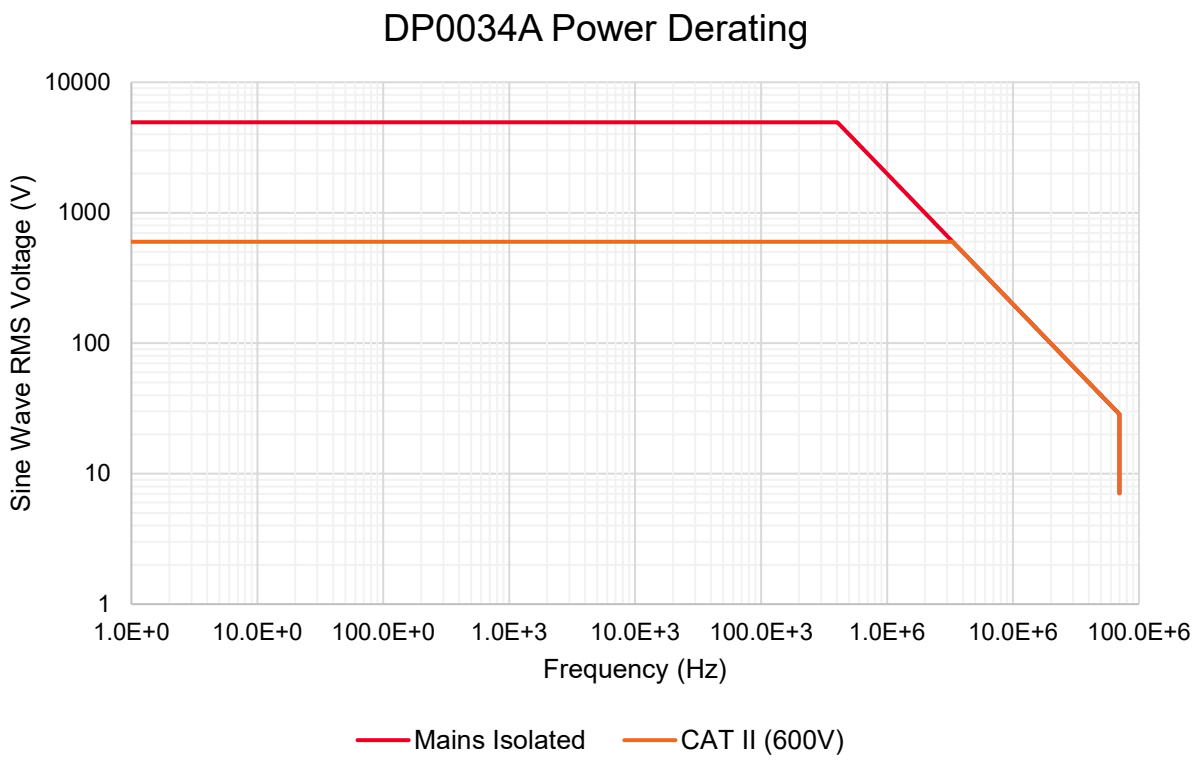


Figure 8. Voltage derating curve of the DP0034A probe (voltage between either input or ground)

Oscilloscope Compatibility

The DP0030A model has a universal BNC and USB interface, so it is compatible with any oscilloscope with 1 MΩ BNC inputs, including Keysight's InfiniiVision 1000X and 2000X-Series oscilloscopes.

Model numbers DP0031A to DP0034A contain Keysight's AutoProbe 1 interface and are compatible with the following oscilloscopes:

- InfiniiVision HD3 Series oscilloscopes with software version 10.06 or higher.
- InfiniiVision 3000, 4000, 6000 X-Series oscilloscopes with software version 7.65 or higher.
- Infiniium EXR and MXR-Series Oscilloscopes with software version 11.61 or higher.

Ordering Information

Product description	Model number	Services
Probe, Differential, 100 MHz, 750 V	DP0030A	1-year warranty with the option to extend to 3 and 5 years 1-year calibration with Calibration Assurance Plan and the option to extend to 3 or 5 years
Probe, Differential, 200 MHz, 750 V	DP0031A	
Probe, Differential, 200 MHz, 1500 V	DP0032A	
Probe, Differential, 200 MHz, 3000 V	DP0033A	
Probe, Differential, 70 MHz, 7000 V	DP0034A	
Advanced Accessory Kit for DP003xA probes	DP0040A	90-day warranty
Basic Accessory Kit for DP003xA probes	DP0041A	90-day warranty

Related Literature

Literature description
Differential Probe vs Single-Ended Probe Comparison Application Note
Understanding Oscilloscope Probe Specifications Application Note
InfiniiVision 3000G X-Series Oscilloscopes Data Sheet
InfiniiVision 4000G X-Series Oscilloscopes Data Sheet
InfiniiVision 6000 X-Series Oscilloscopes Data Sheet
InfiniiVision Oscilloscopes Probes and Accessories Selection Guide
Infiniium EXR-Series Oscilloscopes Data Sheet
Infiniium MXR B-Series Oscilloscopes Data Sheet
Infiniium UXR B-Series Oscilloscopes Data Sheet
Infiniium Oscilloscope Probes and Accessories Data Sheet

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