

[PRELIMINARY] 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, vehicle 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 the AutoProbe1 interface, which provides power to the active circuitry of the probes' differential amplifiers and automatically sets attenuation settings based on the oscilloscope's vertical scale setting. Model DP0030A contains a BNC interface and uses a USB for power delivery to the probe. 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-M Ω 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) | $\pm 750 / \pm 75$ V | $\pm 750 / \pm 75$ V | $\pm 1500 / \pm 150$ V | $\pm 3000 / \pm 300$ V | $\pm 7000 / \pm 700$ V |
| 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 Accessory Kit | DP0041A Value 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 | | |
| Max 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 μV/°C | | | | |
| Output drive | 1 MΩ | | | | |

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 & Graphs (Typical)

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

Probe Gain (High Attenuation)

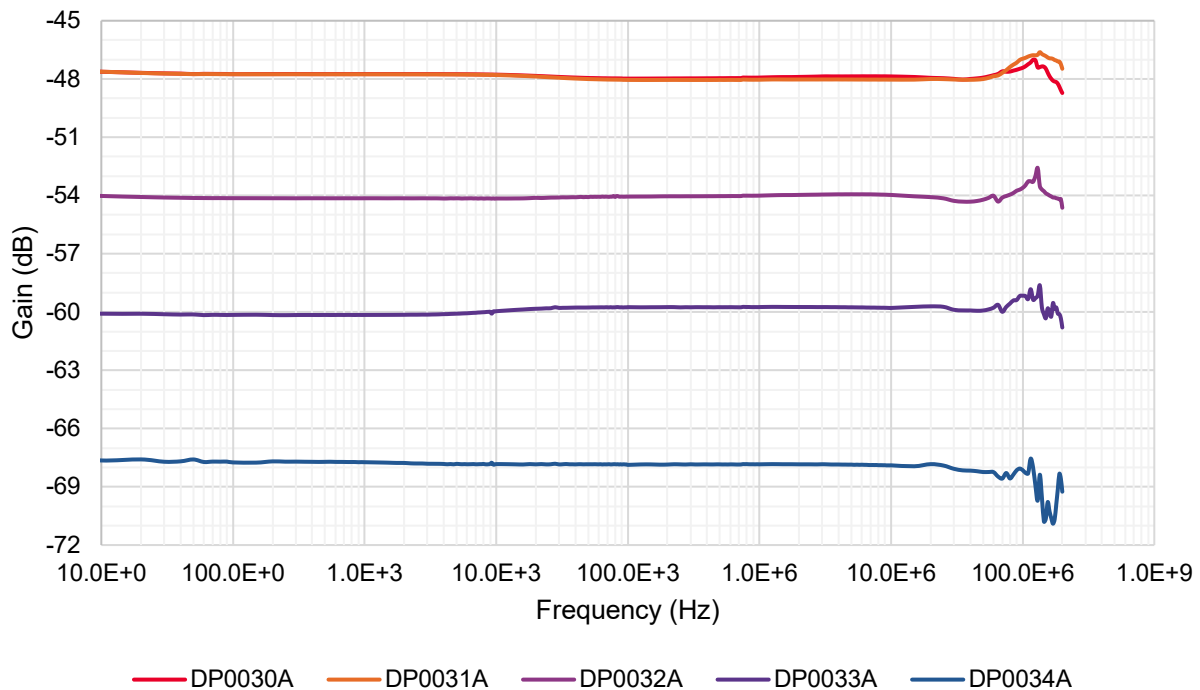


Figure 2. Vout/Vin frequency response of DP003xA probes on high attenuation settings.

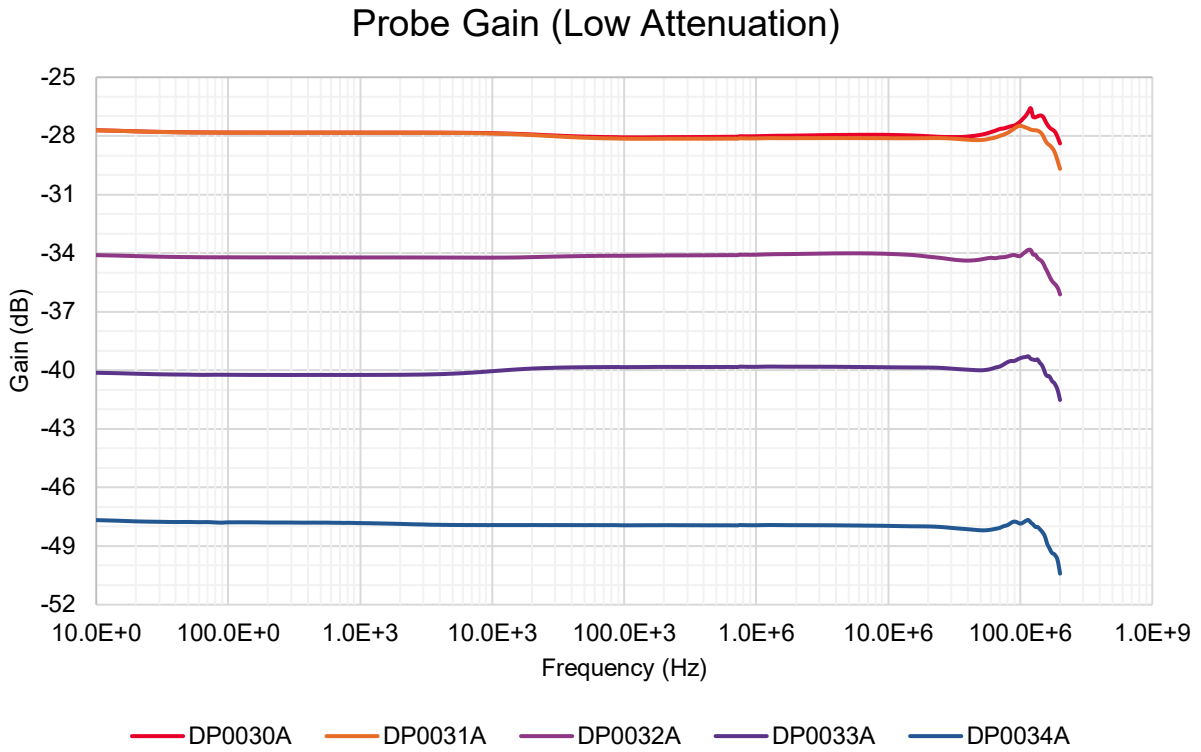


Figure 3. Vout/Vin frequency response of DP003xA probes on low attenuation settings.

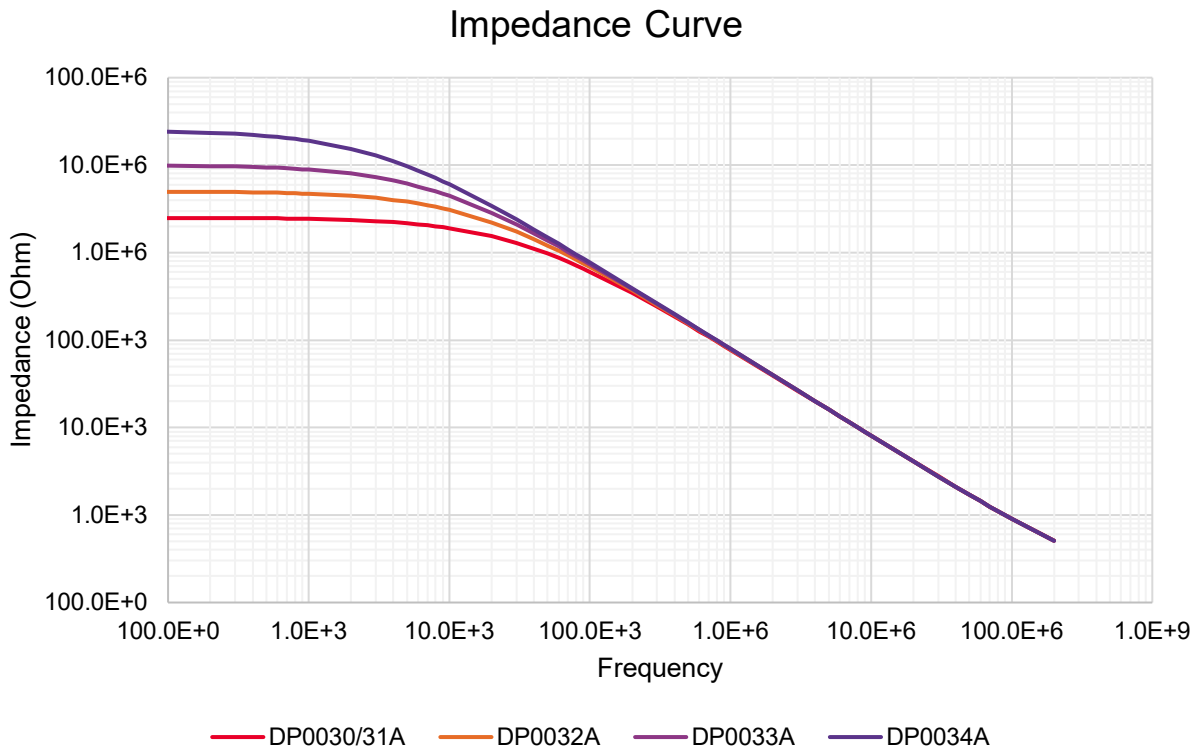


Figure 4. Input impedance vs frequency of the DP003xA Series probes.

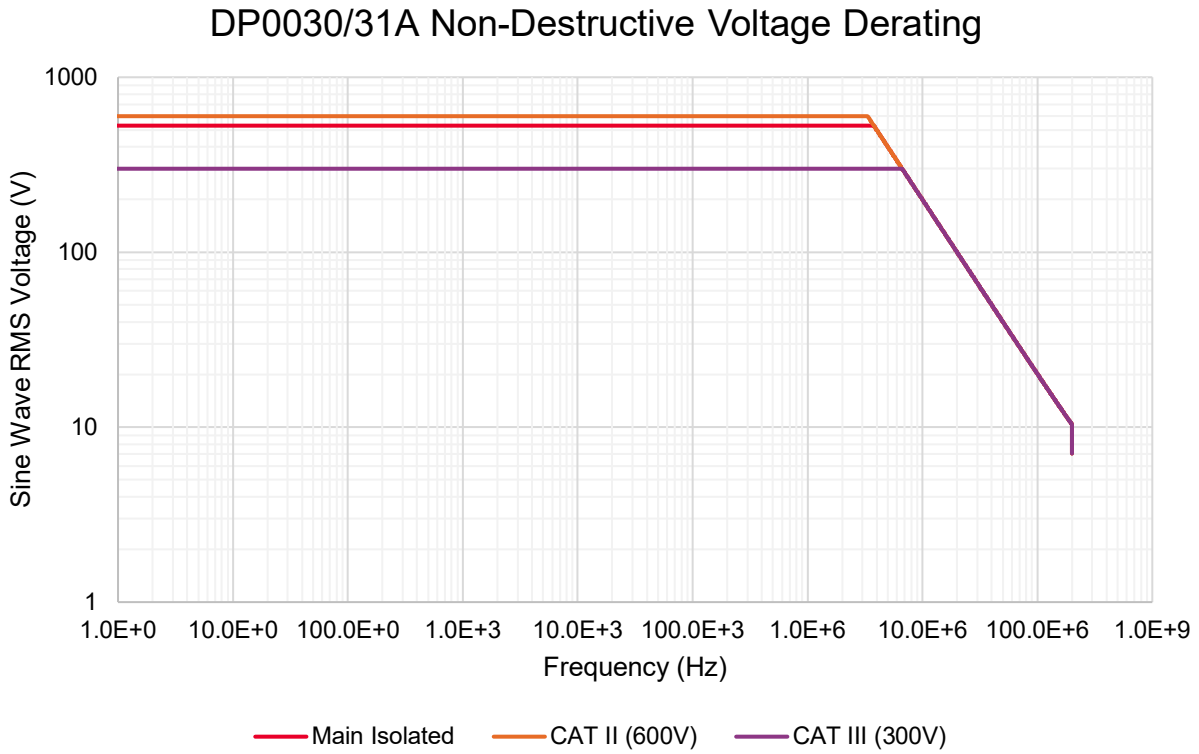


Figure 5. Voltage derating curve of the DP0030/31A probes (voltage between either input or ground).

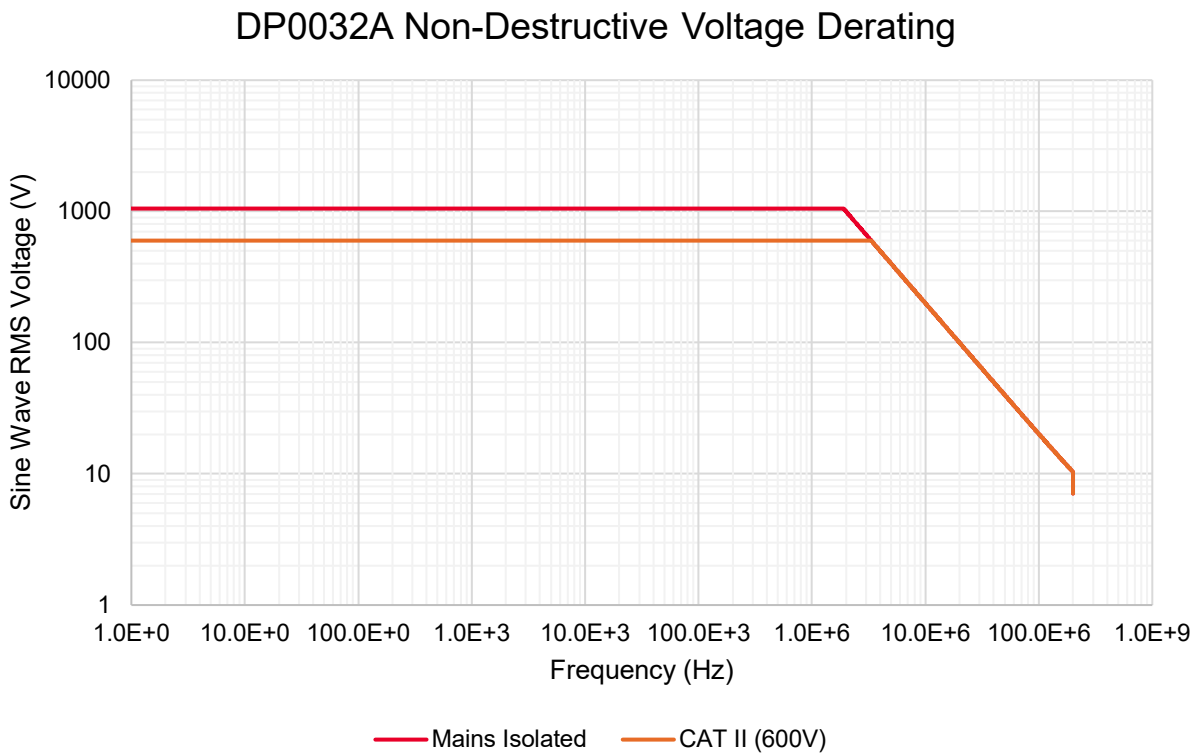


Figure 6. Voltage derating curve of the DP0032A probe (voltage between either input or ground).

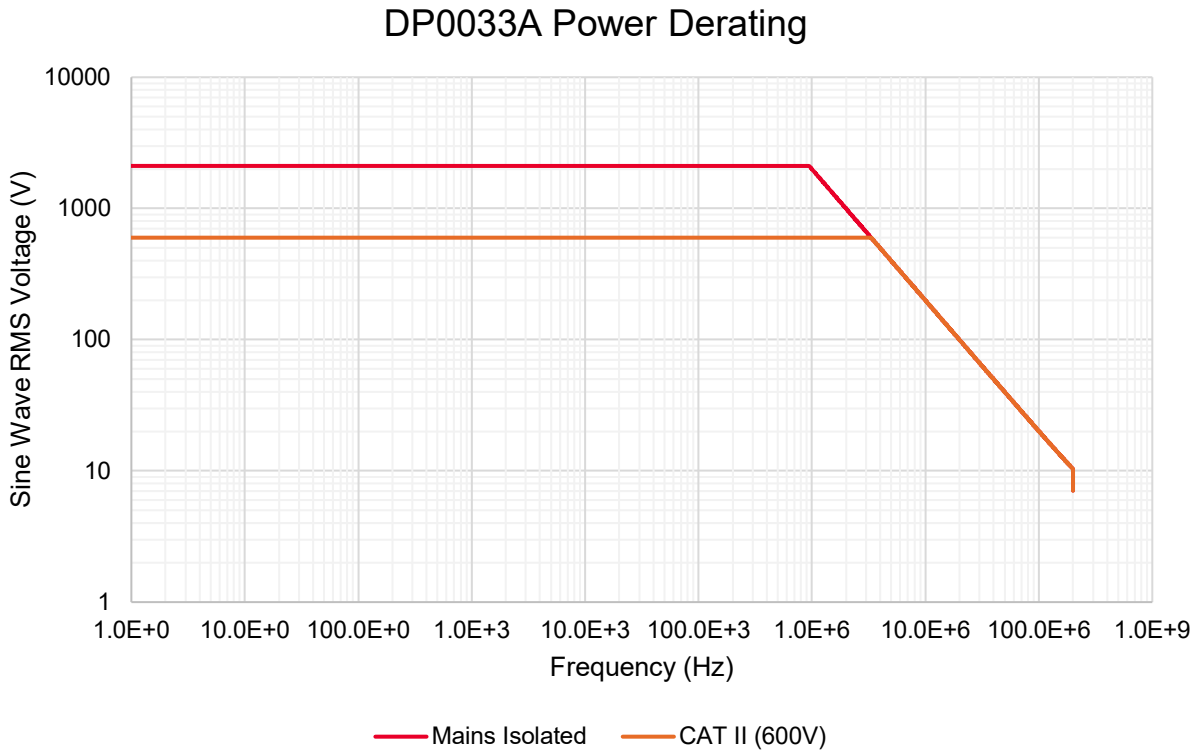


Figure 7. Voltage derating curve of the DP0033A probe (voltage between either input or ground).

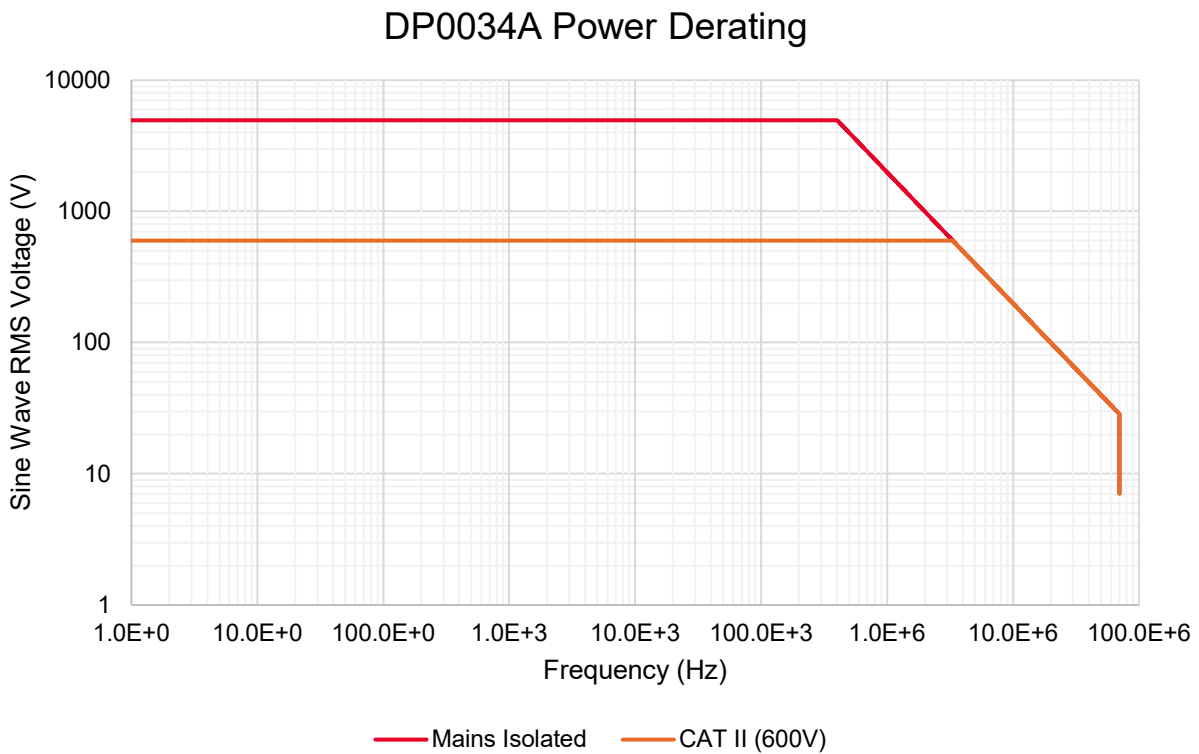


Figure 8. Voltage derating curve of the DP0034A probe (voltage between either input or ground).

Oscilloscope Compatibility

All models of the DP003xA Series high-voltage differential active probes are compatible with the following Keysight oscilloscopes:

- InfiniiVision HD3 Series oscilloscopes with software version 10.05 or higher.
- InfiniiVision 3000G, 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.
- Infiniium UXR-Series oscilloscopes with software version 11.61 or higher and the N5442A adapter.

Ordering Information

| Product description | Model number |
|--|--------------|
| Probe, Differential, 100 MHz, 750 V | DP0030A |
| 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 |
| Accessory kit for DP003xA probes | DP0040A |
| Value Accessory Kit for DP003xA probes | DP0041A |

Related Literature

| Literature description | Publication number |
|--|--------------------|
| InfiniiVision 3000G X-Series Oscilloscopes – data sheet | 5992-0140 |
| InfiniiVision 4000 X-Series Oscilloscopes – data sheet | 5991-1103 |
| InfiniiVision 6000 X-Series Oscilloscopes – data sheet | 5991-4087 |
| InfiniiVision Oscilloscopes Probes & Accessories – selection guide | 5968-8153 |
| Infiniium EXR-Series Oscilloscopes – data sheet | 3120-1495 |
| Infiniium MXR B-Series Oscilloscopes – data sheet | 3123-1557 |
| Infiniium UXR B-Series Oscilloscopes – data sheet | 3123-1313 |
| Infiniium Oscilloscope Probes & Accessories – data sheet | 5968-7141 |

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