DP001xA Series Differential Active Probes

For Keysight InfiniiVision X-Series and Infiniium Oscilloscopes

Introduction

Keysight Technologies' DP001xA Series differential active probes provide the superior general-purpose differential signal measurements that's required for many of today's high-speed power-related measurements such as motor drives, automotive differential bus measurements, and high-speed digital systems design. The DP001xA Series differential active probes are available in bandwidth models ranging from 250 MHz up to 1.7 GHz with a wide input dynamic range and a probe offset range up to ±60 volts.



KEYSIGHT

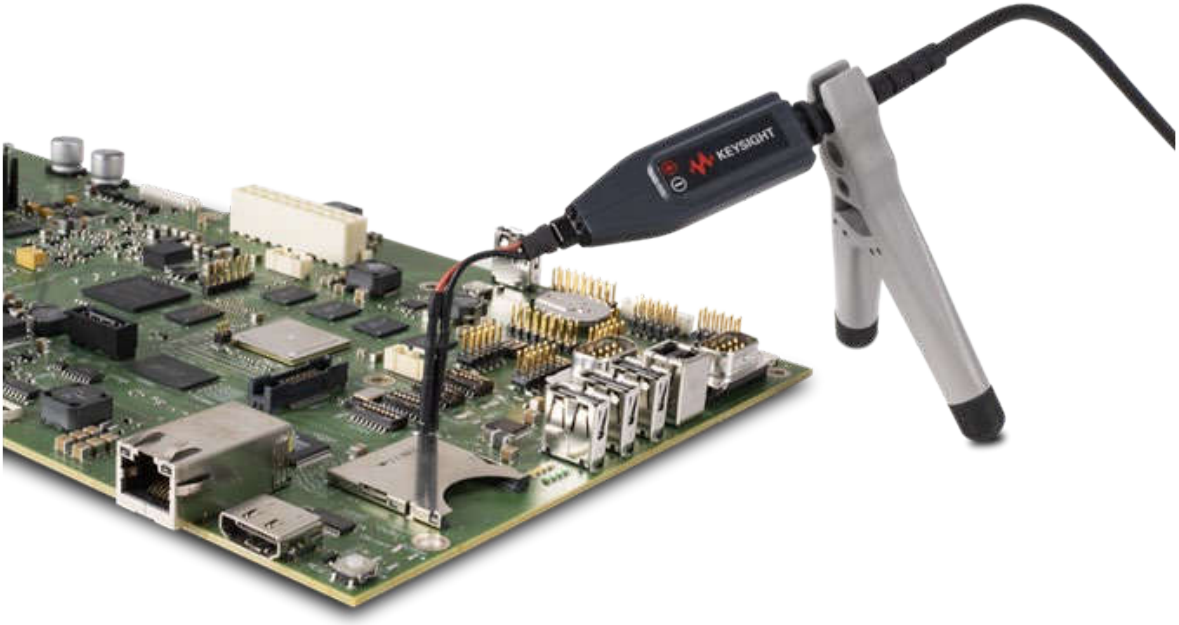


Figure 1. The DP001xA Series differential active probe.

The DP001xA Series probes are equipped with Keysight Technologies' AutoProbe1 interface that provides power and DC offset to the active circuitry of the probe's differential amplifier, as well as automatic attenuation settings based on the oscilloscope's vertical scale setting. These probes are compatible with most of Keysight's InfiniiVision X-Series and Infiniium oscilloscopes that provide selectable 50-Ω input terminations with the AutoProbe1 interface. Select from the following models to meet your differential probing requirements.

	DP0010A	DP0011A	DP0012A	DP0013A
Bandwidth	250 MHz	500 MHz	1.0 GHz	1.7 GHz
Maximum differential measurement range	±8.4 Volts peak on 17:1 auto attenuation ranges ±42 Volts peak on 85:1 auto attenuation ranges			
Input impedance	1.7 MΩ // 0.9 pF (between inputs)			

Probing Accessories

Keysight Technologies' DP001xA Series differential active probes come in a hard plastic carrying case and are supplied with the standard accessories shown in Figure 2.

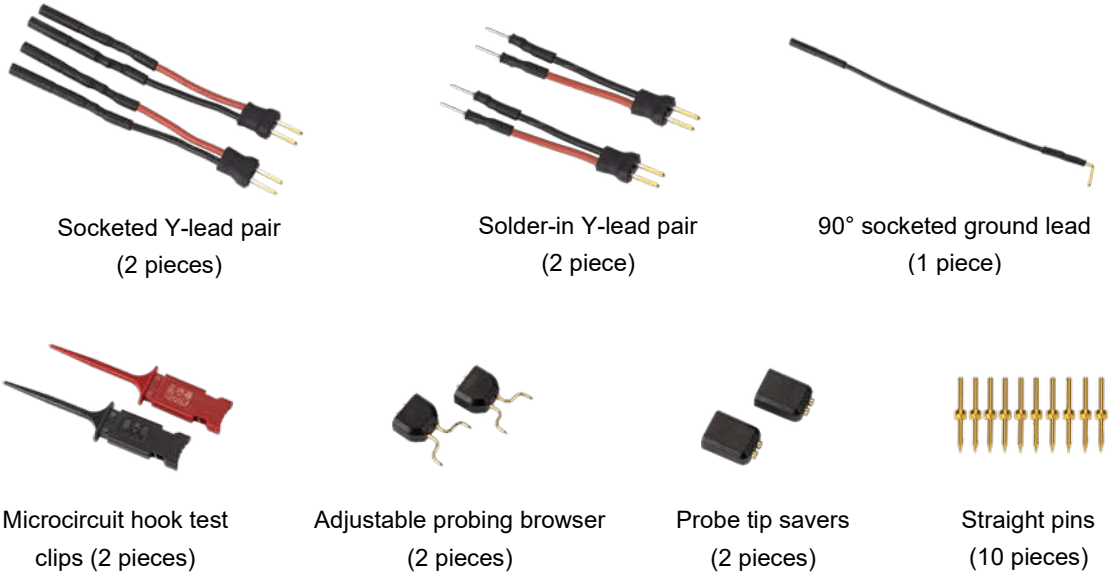


Figure 2. Standard probing accessories that come with each DP001xA Series differential active probe.



Figure 3. The DP001xA differential active probe with its standard case and accessories.

For replacement parts of the standard accessories, the DP0021A accessories kit can be ordered and includes the same items shown in Figure 2. Many of these accessories can also be ordered individually (refer to the Ordering Information table near the end of this document).

Not included as standard accessories, nor included in the DP0021A accessory kit, are the following four optional accessories shown in Figure 4.



Automotive accessory kit, DP0021A-009
(includes sub-DB9 adapter)



Micro-grabber pincer test clips,
DP0021A-008 (Qty: 4)



SMT test clips,
DP0021A-007 (Qty: 2)



Deskew and performance verification
kit, DP0020A (Qty: 1)

Figure 4. Optional probing accessories for the DP001xA Series differential active probes.

The DP0021A-009 automotive accessory kit makes it easy to probe automotive differential serial buses, such as CAN, CAN FD, and FlexRay, in the prototype/development environment where sub-DB9 bus connectors are commonly used. Pin 7 of sub-DB9 connector is designated as the high-side signal of the differential bus, while pin 2 is designated as the low-side of the differential bus. Testing differential signals with rise/fall times faster than 5.0 ns should be avoided for optimum pulse response.

The DP0020A deskew and performance verification kit includes various SMA-to-BNC adapters and a deskew board with header pins (compatible with the socketed Y-lead pair adapter) that can be used to deskew multiple probes relative to a single timing reference point. The deskew board can also be used to verify performance characteristics including bandwidth, rise/fall times, and pulse response. Refer to the User's Guide for more details.

Electrical Specifications and Characteristics

	DP0010A	DP0011A	DP0012A	DP0013A
Bandwidth (-3 dB)	250 MHz[1]	500 MHz[1]	1.0 GHz[1]	1.7 GHz[1]
Probe rise time (10% to 90%)	1.35 ns	715 ps	415 ps	300 ps
Auto attenuation ranges[2]	~17:1 (auto selected 2 V/div and below) ~85:1 (auto selected above 2 V/div)			
Absolute maximum rated input voltage (each side to ground)[3] 	30 V_{RMS}, ±42 V_{PEAK}, or ±60 V_{DC} (mains isolated)[4]			
Overvoltage and measurement category per IEC-61010-031	Non-CAT (mains isolated)[4]			
Max differential measurement range (DC + AC peak)	±42 V			
Input resistance // capacitance	1.7 MΩ[1] // 0.9 pF (between inputs) 850 kΩ[1] // 1.5 pF (each side to ground)			
Offset adjustment range	±60 V			
Common mode rejection ratio	100 Hz: -70 dB 1 kHz: -70 dB 20 kHz: -65 dB 5 MHz: -30 dB (17:1), -25 dB (85:1) 250 MHz: -30 dB (17:1), -25 dB (85:1)			
Noise referenced to input[5] (probe only)	14 mV_{RMS} (17:1 attenuation ranges) 40 mV_{RMS} (85:1 attenuation ranges)			

[1] Denotes warranted specification.
[2] Actual attenuation setting determined during auto probe calibration.
[3] Maximum rated input voltage applied to the probe and all probing accessories.
[4] Mains isolated is for measurements performed on circuits not directly connected to a mains supply.
[5] This specification is subject to change in the future. Sample size is 1 unit.

Mechanical and Environmental Characteristics

	DP0010A	DP0011A	DP0012A	DP0013A
Operating ambient temperature	+5 to +40° C			
Non-operating Ambient temperature	-40 to +70° C			
Operating humidity	Up to 80% RH @ +40° C			
Non-operating humidity	Up to 90% RH @ +65° C			
Operating altitude	3,100 meters			
Non-operating altitude	4,600 meters			
Pollution Degree	2			
Approximate weight	0.48 kg, 1.06 lbs. (in case with all standard accessories)			
Output cable length	1.3 meters			

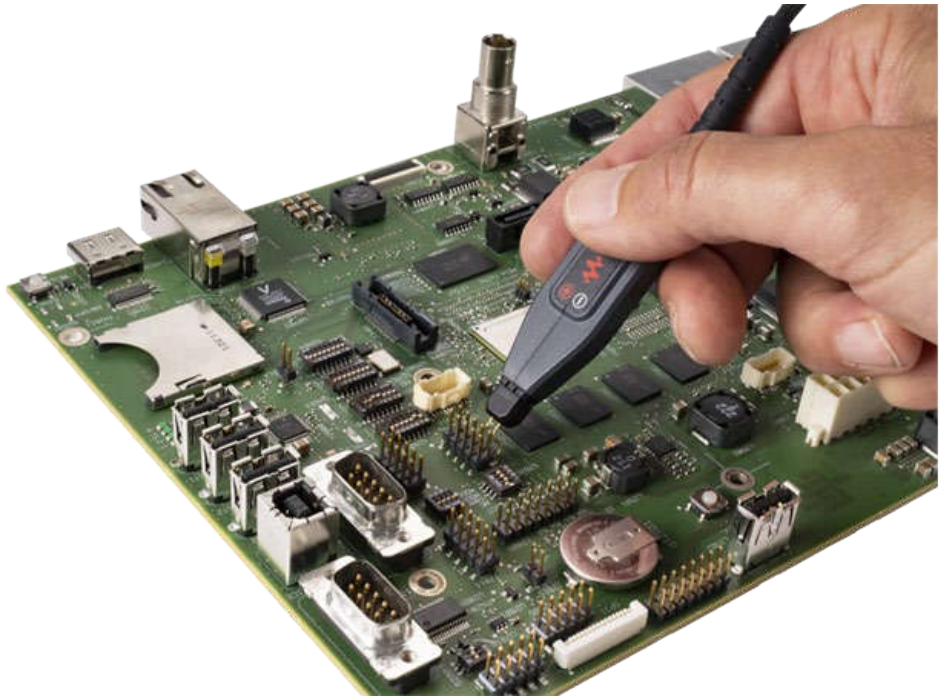


Figure 5. Using the DP001xA Series differential active probe with the adjustable browser probing tip.

Performance Plots & Graphs (typical)

Performance plots are based on using the DP001xA probe without probing accessories. For additional performance plots based on using probing accessories, refer to the User's Guide.

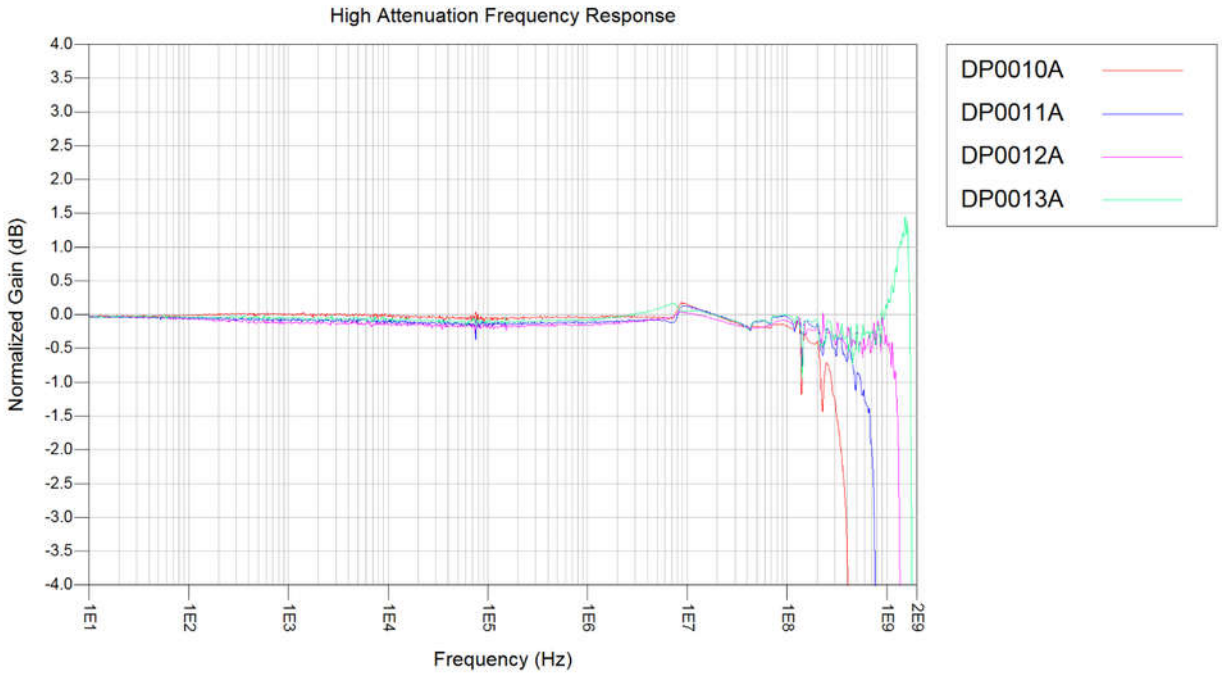


Figure 6. Vout/Vin frequency response of DP001xA probes on high attenuation settings.

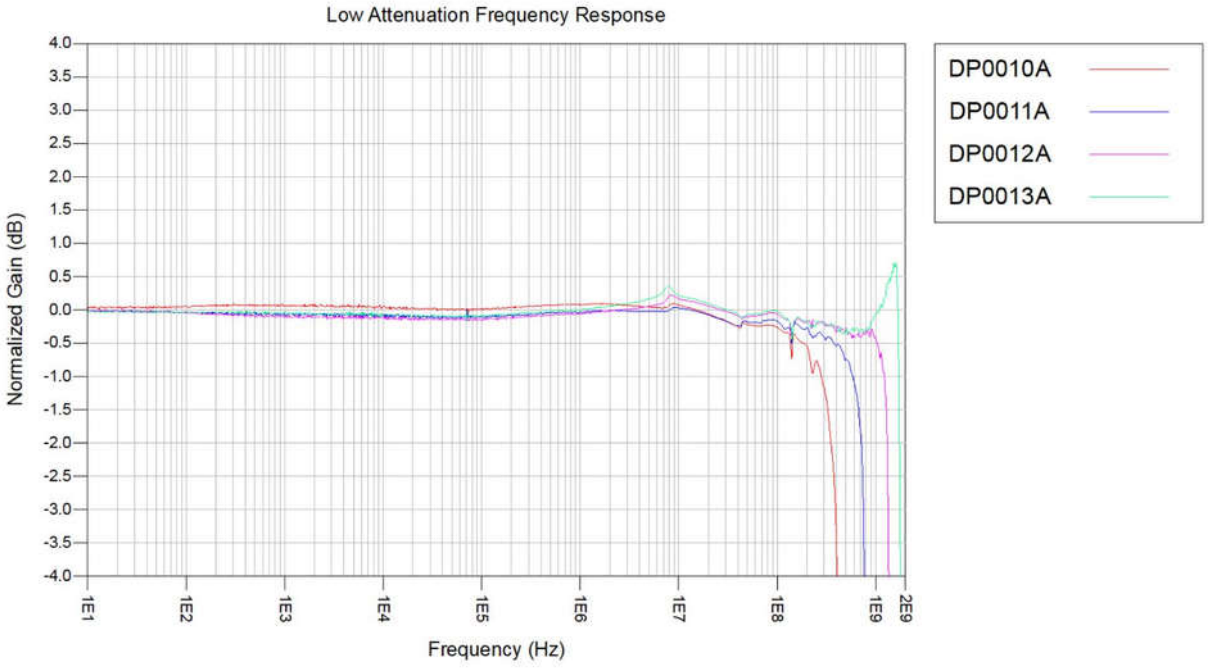


Figure 7. Vout/Vin frequency response of DP001xA on low attenuation ranges.

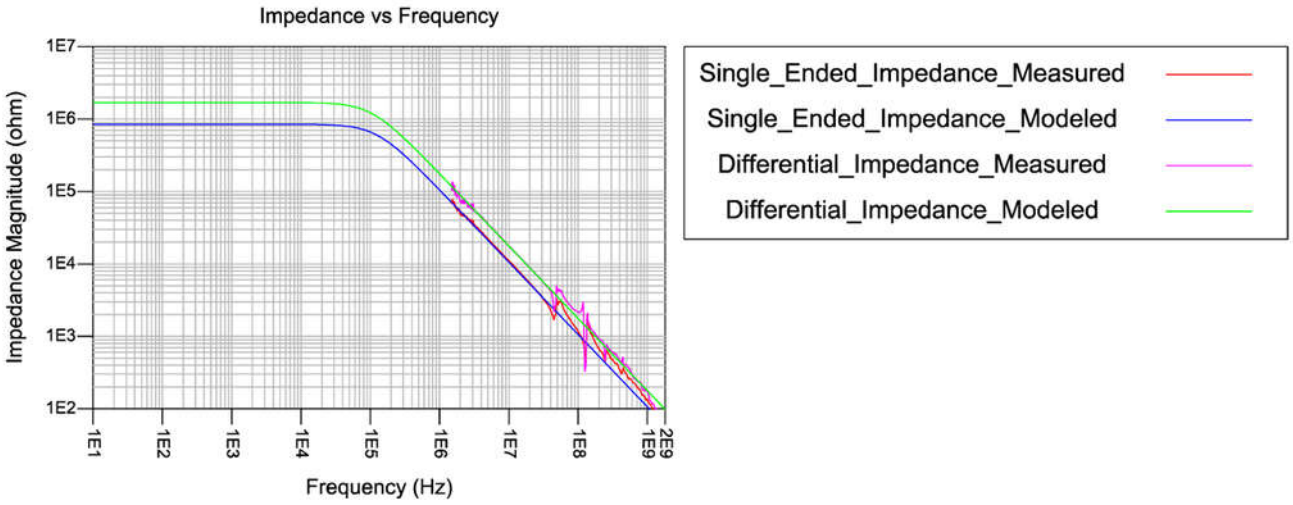


Figure 8. Input impedance vs frequency of the DP001xA Series probes.

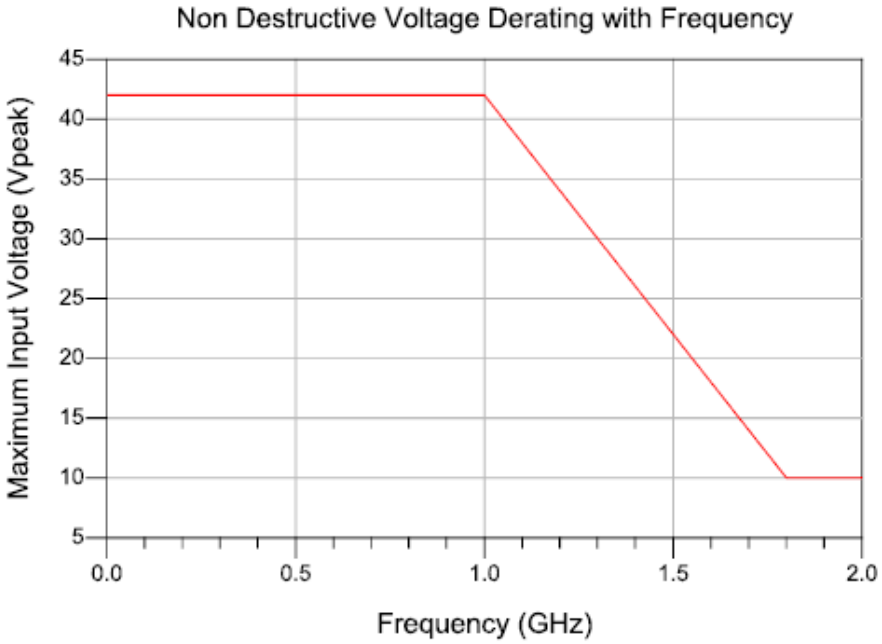


Figure 9. Voltage derating curve of the DP001xA Series probes (voltage between either input or ground).

Oscilloscope Compatibility

All models of the DP001xA Series differential active probes are compatible with following Keysight oscilloscopes.

- InfiniiVision 3000T (one channel only), 4000, 6000 X-Series oscilloscopes
- Infiniium EXR, MXR, S, and 9000A/H Series oscilloscopes
- Infiniium UXR, V, Z, and Q Series with the N5442A adapter

Ordering Information

Product description	Model number
250-MHz bandwidth differential active probe	DP0010A
500-MHz bandwidth differential active probe	DP0011A
1-GHz bandwidth differential active probe	DP0012A
1.7-GHz bandwidth differential active probe	DP0013A
Deskew and performance verification kit	DP0020A
Accessory kit for DP001xA Series probes (replaces standard accessories)	DP0021A-001
Socketed Y-lead pair (Includes 2 pieces)	DP0021A-002
Solder-in Y-lead pair (Includes 2 pieces)	DP0021A-003
Micro circuit hook test clips (Includes 2 pieces)	DP0021A-004
Adjustable probing browser (Includes 2 pieces)	DP0021A-005
Straight pins (Includes 10 pieces)	DP0021A-006
SMT test clips, not included in DP0021A-001 accessory kit (Includes 2 pieces)	DP0021A-007
Micro-grabber pincer test clips, not included in DP0021A-001 accessory kit (Includes 4 pieces)	DP0021A-008
Automotive accessory kit (includes sub-DB9 adapter)	DP0021A-009

Related Literature

Literature description	Publication number
InfiniiVision 3000T 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-Series Oscilloscopes – data sheet	7120-1115
Infiniium S-Series Oscilloscopes – data sheet	5991-3904
Infiniium Oscilloscope Probes & Accessories – selection	5968-7141

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