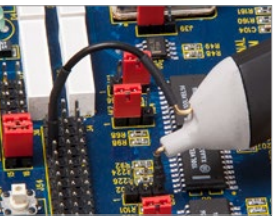
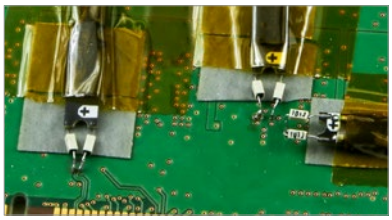
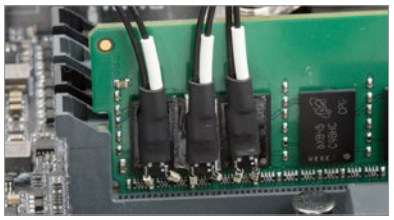
TELEDYNE LECROY
Everywhereyoulook™

Oscilloscope Probes and Probe Accessories

Teledyne LeCroy has a wide variety of world class probes and amplifiers to compliment its product line. From the ZS high impedance active probes to the DH Series Differential High-bandwidth Probes which offers bandwidths up to 30 GHz, Teledyne LeCroy probes and probe accessories provide optimum mechanical connections for signal measurement.

Front Cover:
DH Series Differential High-bandwidth Probes

	WaveSurfer 3000z Oscilloscopes	HDO4000A High Definition Oscilloscopes	WaveSurfer 4000HD High Definition Oscilloscopes	HDO6000A High Definition Oscilloscopes	WaveRunner 9000 Oscilloscopes	WaveRunner 8000HD High Definition Oscilloscopes/ MDA8000HD Motor Drive Analysers	WavePro HD High Definition Oscilloscopes	WaveMaster/SDA 8 Zi-B Oscilloscopes	LabMaster 10 Zi-A Oscilloscopes
60 V Common Mode Differential Probes - p. 4 - 5									
DL05-HCM	✓	✓	✓	✓	✓	✓	✓	✓	✓
DL10-HCM	✓	✓	✓	✓	✓	✓	✓	✓	✓
Active Voltage Rail Probes - p. 6 - 9									
RP4030	✓	✓	✓	✓	✓	✓	✓	✓	✓
Active Voltage Probes - p. 10 - 13									
ZS1000	✓	✓	✓	✓	✓	✓	✓	✓	
ZS1500	✓	✓	✓	✓	✓	✓	✓	✓	
ZS2500					✓		✓	✓	✓
ZS4000					✓		✓	✓	✓
Current Probes - p. 14 - 17									
CP030	✓	✓	✓	✓	✓	✓	✓	✓	
CP030A	✓	✓	✓	✓	✓	✓	✓	✓	
CP031	✓	✓	✓	✓	✓	✓	✓	✓	
CP031A	✓	✓	✓	✓	✓	✓	✓	✓	
CP150	✓	✓	✓	✓	✓	✓	✓	✓	
CP500	✓	✓	✓	✓	✓	✓	✓	✓	
CA10		✓		✓	✓	✓	✓	✓	
Differential Probes - p. 18 - 27									
ZD200	✓	✓	✓	✓	✓	✓	✓	✓	✓
ZD500	✓	✓	✓	✓	✓	✓	✓	✓	✓
ZD1000	✓	✓	✓	✓	✓	✓	✓	✓	✓
ZD1500	✓	✓	✓	✓	✓	✓	✓	✓	✓
AP033	✓	✓	✓	✓	✓	✓	✓	✓	
D410-A-PB2					✓		✓	✓	✓
D420-A-PB2					✓		✓	✓	✓
D400A-AT-PB2					✓			✓	✓
D610-A-PB2							✓	✓	✓
D610-A-PL								✓	✓
D620-A-PB2							✓	✓	✓
D620-A-PL								✓	✓
D600A-AT-PB2								✓	✓
D600A-AT-PL								✓	✓
D830-PB2							✓	✓	
D830-PL								✓	✓
D1330-PL								✓	✓
DH08-PB2								✓	✓
DH08-PL								✓	✓
DH13-PL								✓	✓
DH16-PL								✓	✓
DH20-PL								✓	✓
DH25-2.92MM								✓	✓
DH30-2.92MM								✓	✓


	WaveSurfer 3000z Oscilloscopes	HDO4000A High Definition Oscilloscopes	WaveSurfer 4000HD High Definition Oscilloscopes	HDO6000A High Definition Oscilloscopes	WaveRunner 9000 Oscilloscopes	WaveRunner 8000HD High Definition Oscilloscopes/ MDA8000HD Motor Drive Analysers	WavePro HD High Definition Oscilloscopes	WaveMaster/SDA 8 Zi-B Oscilloscopes	LabMaster 10 Zi-A Oscilloscopes
High Voltage Differential Probes - p. 28 - 33									
HVD3102A	✓	✓	✓	✓	✓	✓	✓	✓	
HVD3106A	✓	✓	✓	✓	✓	✓	✓	✓	
HVD3106A-6M	✓	✓	✓	✓	✓	✓	✓	✓	
HVD3206A	✓	✓	✓	✓	✓	✓	✓	✓	
HVD3206A-6M	✓	✓	✓	✓	✓	✓	✓	✓	
HVD3220	✓	✓	✓	✓	✓	✓	✓	✓	
HVD3605A	✓	✓	✓	✓	✓	✓	✓	✓	
AP031	✓	✓	✓	✓	✓	✓	✓	✓	
High Voltage Probes - p. 34 - 37									
HVP120	✓	✓	✓	✓	✓	✓	✓	✓	
PPE4KV	✓	✓	✓	✓	✓	✓	✓	✓	
PPE5KV	✓	✓	✓	✓	✓	✓	✓	✓	
PPE6KV	✓	✓	✓	✓	✓	✓	✓	✓	
High Voltage Fiber Optically-isolated Probes - p. 38 - 41									
HVFO108	✓	✓	✓	✓	✓	✓	✓	✓	
Optical-To-Electrical Converters - p. 42 - 45									
OE6250G-M									
OE695G								✓	✓
OE425					✓		✓	✓	✓
OE455					✓		✓	✓	✓
OE525								✓	✓
OE555								✓	✓
Passive Probes - p. 46 - 49									
PP016									
PP018		✓							
PP019	✓		✓						
PP020	✓								
PP021						✓		✓	
PP022					✓				
PP023				✓			✓		
PP024					✓				
PP025						✓		✓	
PP026		✓	✓	✓			✓		
Probe Adapters - p. 50 - 51									
CA10		✓		✓	✓	✓	✓	✓	
TPA10	✓		✓	✓	✓	✓	✓	✓	
Transmission Line Probes - p. 52 - 53									
PP066							✓	✓	✓

60 V COMMON MODE DIFFERENTIAL PROBES

Teledyne LeCroy
60 V Common Mode
Differential Probe Model
Numbers:

DL05-HCM
DL10-HCM

The 60 V Common Mode Differential Probes are the ideal probes for low voltage GaN power conversion measurement with the highest accuracy, best CMRR, and lowest noise.

Ideal Probes for 48 V GaN Power Conversion

60 V of common mode and 80 V differential input range with 1 GHz of bandwidth, make these probes ideal for low voltage GaN power conversion measurements. The 60 V of common mode is well suited for handling any float of the battery and bulk/absorption voltage during charging, while the 80 V differential input range provide margin for any overshoot.

Highest Accuracy

The DL-HCM probes are calibrated for high-precision measurements to within 0.5% at DC and 0.1 dB flatness from DC to 100 MHz. This provides for high accuracy of top and base voltage levels of pulse-width modulated signals. The Precision Gain Calibration capability permits further measurement precision by improving the gain accuracy and removing small offset drifts from the measurement configuration.

Lowest Noise and Highest Rejection

The Common Mode Rejection Ratio (CMRR) is exceptional to very high frequencies. This provides for the best measurement performance when measuring very fast slew rate (high dV/dt) PWM signals typical of GaN devices and systems. Exceptional CMRR combined with low probe noise and high offset capability makes the probes capable of measuring very small control signals floating on high common mode voltages.

Wide Variety of Tips

The DL-HCM probes provide the perfect combination of high performance and flexibility for connecting to any device under test. An optional accessory kit and high temperature solder-in tip are available for further connectivity options.

Key Applications

- **48 V motors and drives**
- **High-power DC-DC converters**
- **GaN-based PDNs**
- **AC-DC switch-mode power supplies**
- **Wireless charging systems**
- **Gate-drive measurements**

Key Features

Ideal probe for 48 V Power Conversion

- **500 MHz and 1 GHz bandwidth**
- **80 V dynamic range**
- **60 V common mode**

Highest accuracy

- **0.5% gain accuracy**
- **Precision gain calibration**
- **Best LF flatness (0.1 dB)**

Lowest noise and highest rejection

Ordering Information

Product Description	Product Code
500 MHz 60V Common Mode Differential Probe. Includes standard set of leads and tips.	DL05-HCM
1 GHz 60V Common Mode Differential Probe. Includes standard set of leads and tips.	DL10-HCM
DL-HCM series high-temperature solder-in tip, 30 MHz bandwidth, 1 meter length.	DL-HCM-HiTemp
DL-HCM series accessories kit with probe holder, micro IC grabbers (Qty 2.), and Y-banana adaptor.	DL-HCM-Acc-Kit

Standard leads and tips

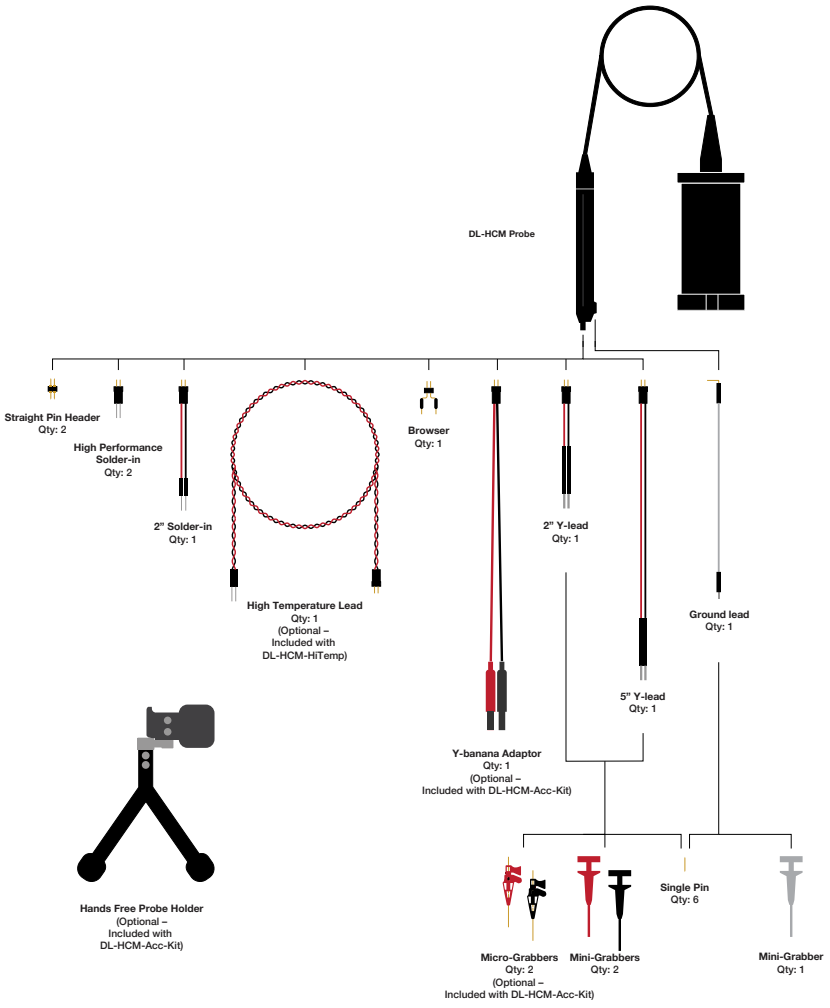
High performance solder-in tips (Qty. 2)
2" solder-in tip
Browser
Y-lead socket (2" and 5")
Mini grabbers (Qty. 3)
Ground lead
Single pin (Qty. 6)
Straight pin header (Qty. 2)

60 V COMMON MODE DIFFERENTIAL PROBES

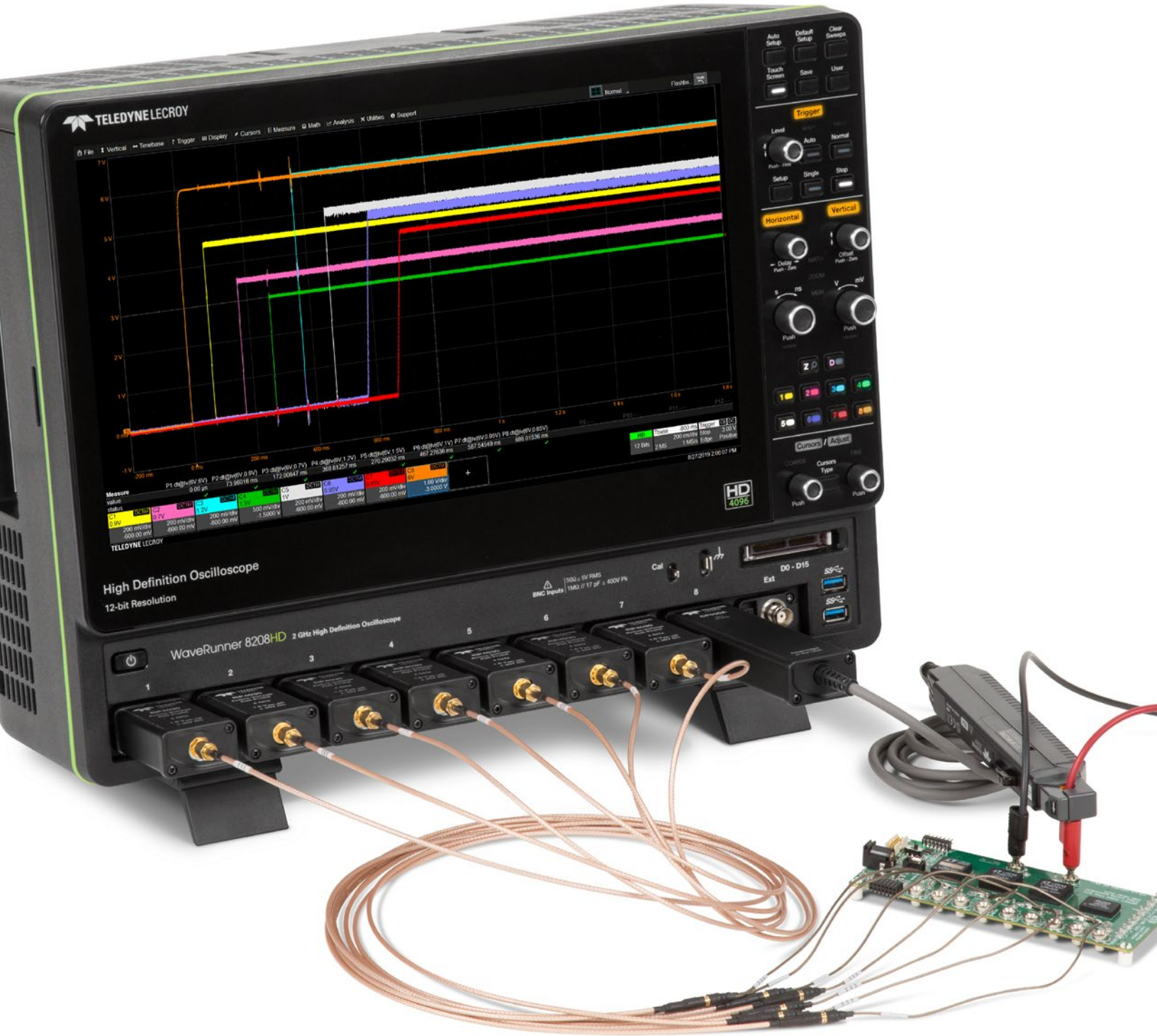
	DL05-HCM	DL10-HCM
Bandwidth*	500 MHz (guaranteed, without leads) 500 MHz (High performance solder-in and browser) 500 MHz (2" Y-lead/solder-in) 500 MHz (5" Y-lead) 30 MHz (Hi-Temp lead)	1 GHz (guaranteed, without leads) 1 GHz (High performance solder-in and browser) 800 MHz (2" Y-lead) 700 MHz (solder-in) 500 MHz (5" Y-lead) 30 MHz (Hi-Temp lead)
Rise Time (10-90%)*	700 ps	350 ps
Differential Voltage Range	80 V (DC + peak AC) from 200 mV/div to 20 V/div	
Common Mode Voltage Range	±60 V (DC + peak AC)	
Maximum Input Voltage to Earth	80 V (DC + peak AC), max 60 V DC (either input to ground)	
Maximum Safe Input Voltage	For Hand-held use: 28.28 Vrms or 60 V DC (referenced to ground) per IEC/EN 61010-031:2015	
Sensitivity	200 mV/div to 1 V/div (7.8x) 1.02 V/div to 2.5 V/div (17.5x) 2.55 V/div to 20 V/div (70x)	
DC Gain Accuracy	±0.5% (guaranteed)	
DC Gain Drift	≤ 0.075%/°C, can be calibrated out with precision gain cal	
Frequency Response Flatness	DC to 100MHz: 0.1 dB	
Offset Range	±60V	
Attenuation	7.8x / 17.5x / 70x	
Input Impedance	200 kΩ || 0.6 pF (between inputs), 100 kΩ || 1 pF (either input to ground)	
Input/Output Coupling	DC	
Output Termination	50 Ω	
Interface	ProBus	
Cable Length	1.42 m from probe sockets to oscilloscope connection	

Noise and Rejection

CMRR	DC - 10 kHz: 80 dB 100 kHz: 70 dB 1 MHz: 55 dB 100 MHz: 50 dB 500 MHz: 35 dB	DC - 10 kHz: 80 dB 100 kHz: 70 dB 1 MHz: 55 dB 100 MHz: 50 dB 1 GHz: 30 dB
Noise (Probe)	200 mV/div to 1 V/div: 3.25mV$_{rms}$ 1.02 V/div to 2.5 V/div: 4.5mV$_{rms}$ 2.55 V/div to 20 V/div: 14.5mV$_{rms}$	200 mV/div to 1 V/div: 4.3mV$_{rms}$ 1.02 V/div to 2.5 V/div: 6mV$_{rms}$ 2.55 V/div to 20 V/div: 20mV$_{rms}$



ACTIVE VOLTAGE RAIL PROBE



The RP4030 is designed specifically to probe a 50Ω DC power/voltage rail. The probe has large built-in offset, low attenuation (noise), and high DC input impedance. Built-in offset and low attenuation permit the power/voltage rail to be offset in the oscilloscope by its mean DC voltage with high oscilloscope gain (sensitivity) to achieve a noise-free view of small signal variations. The high DC input impedance eliminates loading of the DC rail.

Teledyne LeCroy
Active Voltage Rail Probe
Model Numbers:

RP4030

Opposite page:
Active Voltage Rail Probes RP4030 with a WaveRunner 8000HD High Definition Oscilloscope.

ACTIVE VOLTAGE RAIL PROBE

Teledyne LeCroy
Active Voltage Rail Probe
Model Number:
RP4030

Key Features

4 GHz Bandwidth

±30V Offset Capability

±800mV Dynamic Range

50 kΩ DC Input Impedance

1.2x Attenuation (Low Additive Noise, ~5%)

MCX terminated cable with wide variety of connections:

- **Solder-in (4 GHz)**
- **Coaxial Cable to U.FL receptacle (3 GHz)**
- **MCX PCB Mount (4 GHz)**
- **Browser (350 MHz)**

ProBus Interface

Large Offset Range

Permits the DC signal to be displayed in the vertical center of the oscilloscope grid with a high-sensitivity gain setting.

Low Attenuation and Noise

The probe attenuation is a nominal 1.2x coupled to the oscilloscope at DC 50 Ω. This keeps additive noise to a minimum, and makes it exceptionally useful with High Definition oscilloscopes for lowest noise at highest sensitivity gain settings.

High DC Input Impedance

50 kΩ input impedance at DC effectively eliminates probe loading on the DC power/voltage rail and provides for more accurate measurements and signal fidelity.

4 GHz of Bandwidth

Provides maximum bandwidth for probing near the CPU, and the perfect match with the 4 GHz, 12 bit WavePro HD when making power integrity measurements.

Wide Assortment of Tips and Leads

The RP4030 is supplied standard with solder-in and coaxial cables with MCX and U.FL PCB receptacle mounts. A browser tip is optionally available. Additional receptacles or leads may be purchased as accessories and left connected in circuit for easy connection of different signals during different test or validation stages.

Specifications

Electrical Characteristics

Bandwidth	4 GHz (guaranteed, MCX receptacle) 4 GHz (typical, solder-in lead) 3 GHz (typical, U.FL cable + receptacle) 350 MHz (typical, browser)
Rise Time (10-90%)	110 ps (typical, MCX receptacle or solder-in lead)
Input Capacitance	0.1 uF (in series with 50Ω)
DC Input Resistance	50 kΩ
Offset Range	±30V
Attenuation	1.2x
Input Dynamic Range	±800 mV
Non-destruct Voltage	±50V
Noise	~5% additive to oscilloscope noise
Oscilloscope Termination	DC 50Ω

Environmental

Operating Temperature Range	0 to 50 °C
Non-operating Temperature Range	-40 to +70 °C
Humidity	5% to 80% RH (non-condensing) up to 30 °C, decreasing linearly to to 45% RH at 50 °C
Operating Altitude	3000 meters maximum

Physical

RP4030	**Probe:** 38.1 mm W x 15.9mm H x 73mm L (1-1/2" x 5/8" x 2-7/8") **SMA to MCX Cable:** 914mm L (36") **MCX to Solder-in Lead:** 191mm (7-1/2") usable length **MCX to U.FL Plug Coaxial Cable:** 102mm (4") usable length
RP4000-BROWSER	11.9mm W x 9.5mm H x 38mm L (15/32" x 3/8" x 1-1/2") **SMA to SMA Cable:** 1m (39-3/8") usable length

Other

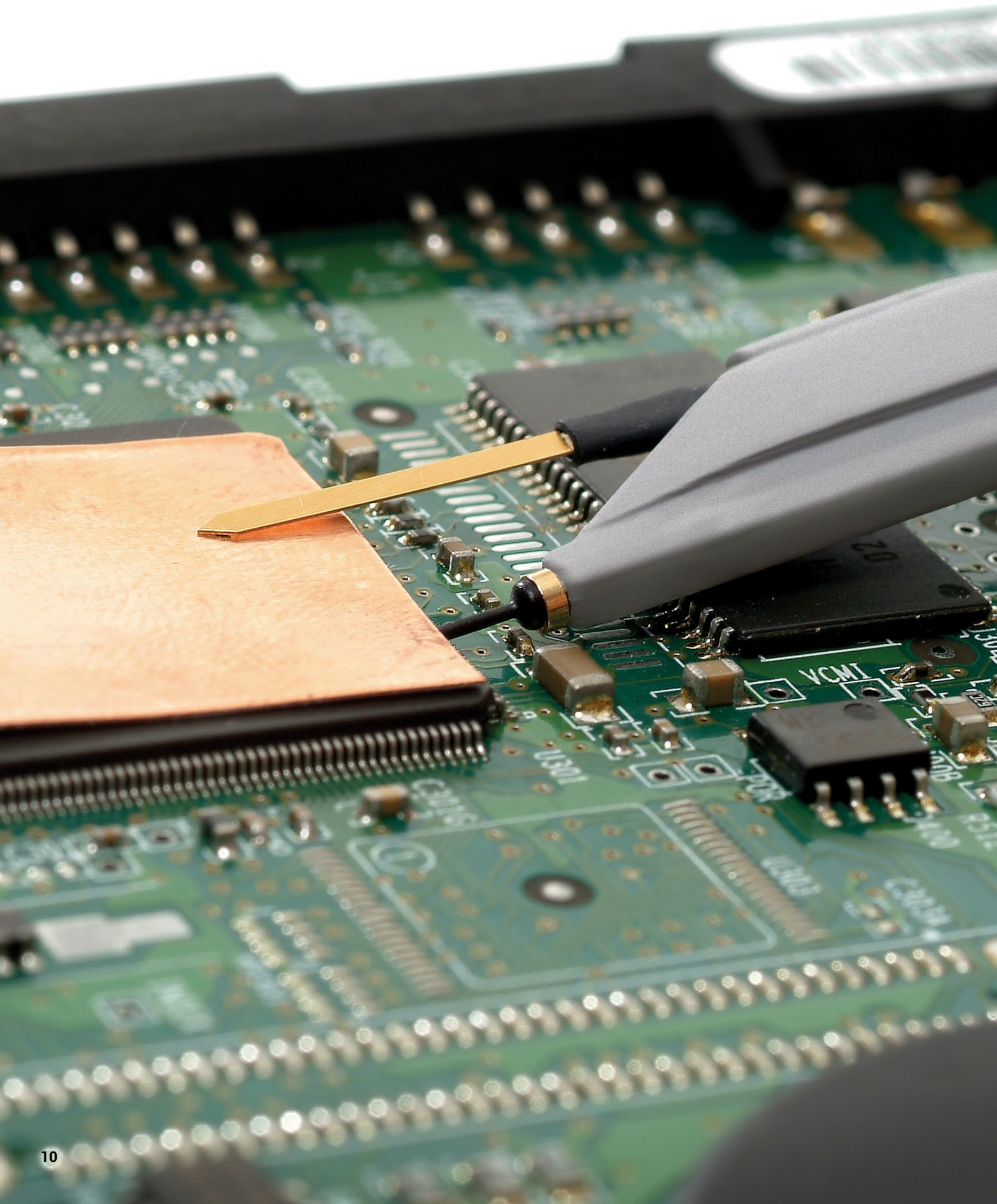
Oscilloscope Interface	Teledyne LeCroy ProBus
Software Requirements	Teledyne LeCroy MAUI 8.2.1.1 or higher
Weight	119 g (0.26 lb)

Ordering Information

Product Description	Product Code
Power/Voltage Rail Probe 4 GHz, 1.2x, ±30V offset, ±800mV dynamic range	RP4030
Includes Qty. 1 ProBus compatible probe offset amplifier with 50 kΩ DC input impedance and SMA input connection for provided 0.9m SMA to MCX extension cable. Also supplied are Qty. 3 MCX solder-in leads, Qty. 3 MCX PCB Mounts, Qty. 3 MCX to U.FL coaxial cables, Qty. 5 U.FL PCB Mounts, Qty. 1 MCX to SMA adapter, and soft carrying case. Browser tip sold separately.	
350 MHz Browser Tip Accessory Includes 0 Ω (1x), 450 Ω (10x) and 950 Ω (20x) tips.	RP4000-BROWSER

Accessories and Consumables

Qty. 3 MCX 4 GHz solder-in leads	RP4000-MCX-LEAD-SI
Qty. 10 MCX PCB mount receptacle	RP4000-MCX-PCBMOUNT
Qty. 3 MCX to U.FL 3 GHz ultra-mini coax cable	RP4000-MCX-CABLE-UFL
Qty. 10 U.FL PCB mount receptacles	RP4000-UFL-PCBMOUNT


VCMI

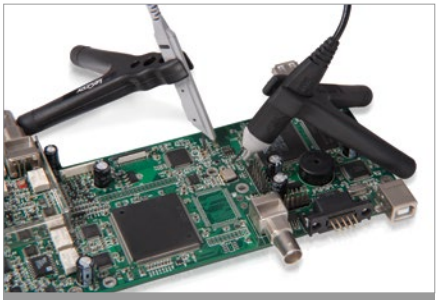
Engineers must commonly probe high-frequency signals with high signal fidelity. Typical passive probes with high input R and C provide good response at lower frequencies, but inappropriately load the circuit and distort signals at higher frequencies. Active voltage probes feature both high input R and low input C to reduce circuit loading across the entire probe/oscilloscope bandwidth. With low circuit loading and a form factor that allows probing in confined areas, the active voltage probe becomes the everyday probe for all different types of signals and connection points.

Teledyne LeCroy
Active Voltage Probe
Model Numbers:

ZS1000
ZS1500
ZS2500
ZS4000

Opposite page:
ZS Series High Impedance Active Probe

ZS SERIES ACTIVE PROBES



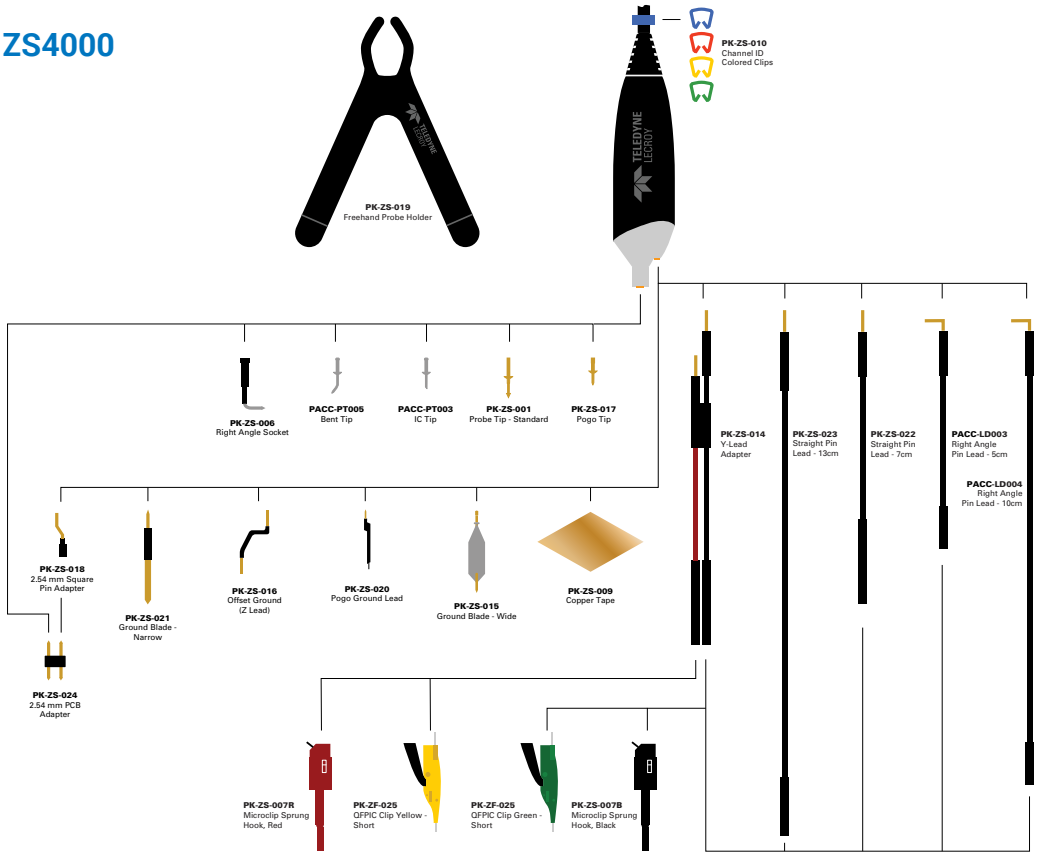
Teledyne LeCroy Active Voltage Probe Model Numbers:

ZS1000
ZS1500
ZS2500
ZS4000

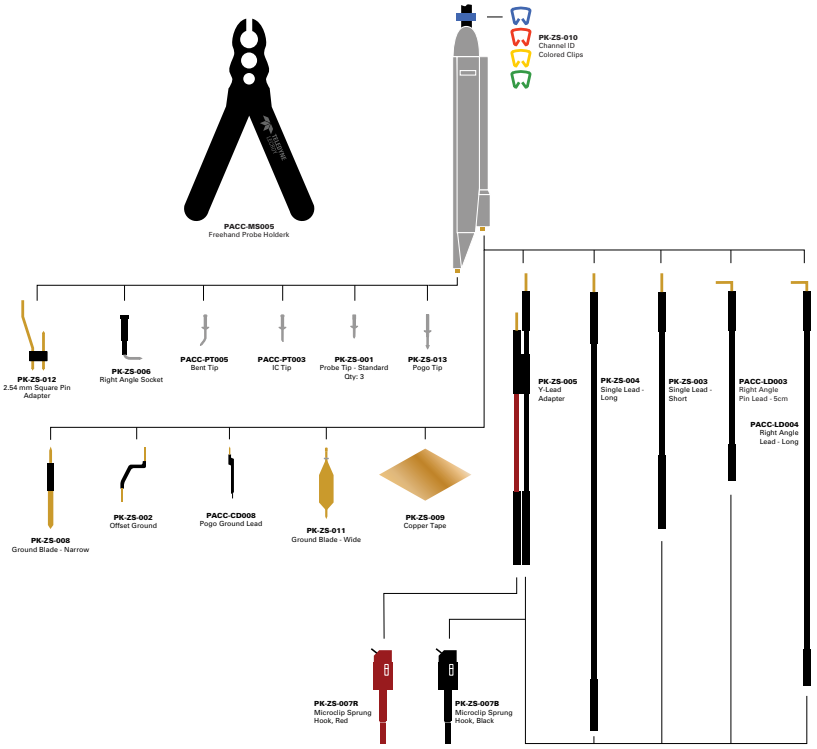
The ZS Series probes are high impedance, low capacitance active probes that maintain high signal fidelity through 4 GHz. A small form factor and a wide variety of accessories ensures the ZS probe meets every difficult probing challenge.

Engineers must commonly probe high frequency signals with high signal fidelity. Typical passive probes with high input R and C provide good response at lower frequencies but inappropriately load the circuit and distort signals at higher frequencies. The ZS Series features both high input R (1 MΩ) and low input C (0.6 pF and 0.9 pF) to reduce circuit loading across the entire probe/oscilloscope bandwidth. The ZS1000 is ideal for 200–600 MHz oscilloscopes. The ZS1500 is ideal for 1 GHz oscilloscopes, the ZS2500 is ideal for 2 GHz oscilloscopes, and the ZS4000 is ideal for 2.5 GHz and 4 GHz oscilloscopes.

ZS4000



ZS1000
ZS1500
ZS2500



Ordering Information

Product Description	Product Code
4 GHz, 0.6 pF, 1 MΩ High Impedance Active Probe	ZS4000
2.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS2500
1.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1500
1 GHz, 0.9 pF, 1 MΩ High Impedance Active Probe	ZS1000
Set of 4 ZS2500, 2.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probes	ZS2500-QUADPAK
Set of 4 ZS1500, 1.5 GHz, 0.9 pF, 1 MΩ High Impedance Active Probes	ZS1500-QUADPAK
Set of 4 ZS1000, 1 GHz, 0.9 pF, 1 MΩ High Impedance Active Probes	ZS1000-QUADPAK

Standard Accessory/Quantity

Accessory Description	Replacement Part Number	ZS1000 ZS1500 ZS2500	ZS4000
2.54 mm PCB Adaptor	PK-ZS-024		5
2.54mm Square Pin Adapter	PK-ZS-012	1	
2.54mm Square Pin Adaptor	PK-ZS-018		1
IC Tip	PACC-PT003	1	1
Bent Tip	PACC-PT005	1	1
Channel ID Clips (Set of 4 colors)	PK-ZS-010	4	1
Copper Tape Pad	PK-ZS-009	2	2
Freehand Probe Holder	PK-ZS-019		1
Freehand Probe Holder	PACC-MS005	1	
Ground Blade – Narrow	PK-ZS-008	1	
Ground Blade – Wide	PK-ZS-011	1	
Ground Blade, Narrow	PK-ZS-021		1
Ground Blade, Wide	PK-ZS-015		2
Micro-Grabber Pair	PK-ZS-007R and PK-ZS-007B	1	2
Offset Ground	PK-ZS-016		2

Specifications ZS1000 ZS1500 ZS2500 ZS4000

Electrical Characteristics

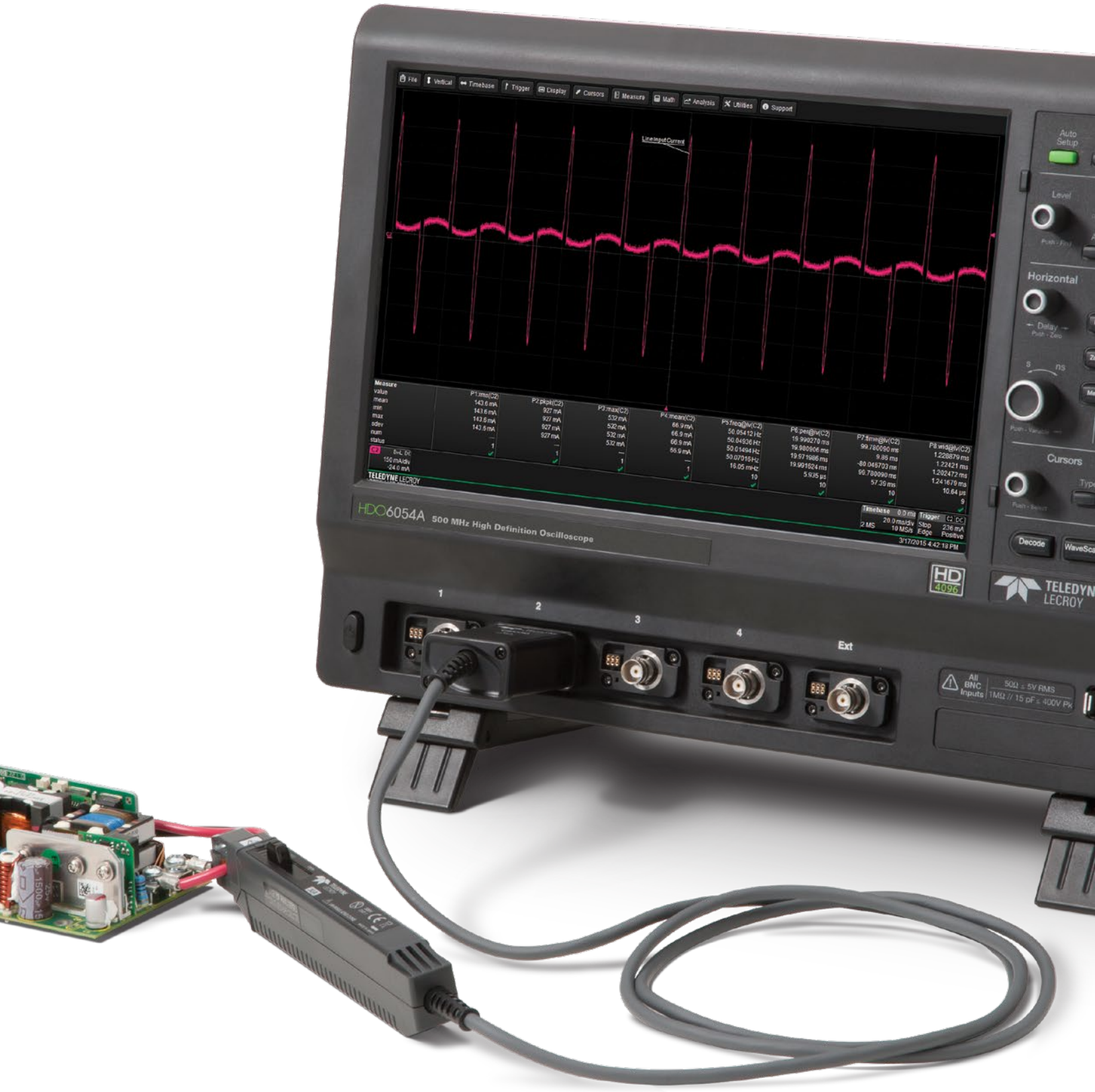
Probe Bandwidth	1 GHz	1.5 GHz	2.5 GHz	4 GHz
Input Capacitance	0.9 pF			0.6 pF
DC Input Resistance	1 MΩ			
Probe Offset Range	N/A	±12 V		
Attenuation	÷10			
Input Dynamic Range	±8 V			
Non-destruct Voltage	20 V			

General Characteristics

Cable Length	1.3 m

Accessory Description	Replacement Part Number	ZS1000 ZS1500 ZS2500	ZS4000
Offset Ground – Z Lead	PK-ZS-002	1	
Pogo Ground Lead	PK-ZS-020		1
Pogo Ground Lead	PACC-CD008	1	
Pogo Tip	PK-ZS-017		3
Pogo Tip	PK-ZS-013	1	
Probe Tip – Standard	PK-ZS-001	3	3
QFPIC Clips (set of 2)	PK-ZS-025		1
Right Angle Lead – Long	PACC-LD004	1	1
Right Angle Lead – Short	PACC-LD003	1	1
Right Angle Socket	PK-ZS-006	1	1
Straight Pin Lead – Long	PK-ZS-023		1
Straight Pin Lead – Long	PK-ZS-004	1	
Straight Pin Lead – Short	PK-ZS-022		1
Straight Pin Lead – Short	PK-ZS-003	1	
Y Lead Adapter	PK-ZS-005	1	
Y Lead Adaptor	PK-ZS-014		1

CURRENT PROBES



Teledyne LeCroy current probes do not require the breaking of a circuit or the insertion of a shunt to make accurate and reliable current measurements. Based on a combination of Hall effect and transformer technology, Teledyne LeCroy current probes are ideal for making accurate AC, DC, and impulse current measurements.

Wide Range of Applications

Teledyne LeCroy current probes are available in a variety of models for a wide range of applications. The full range of Teledyne LeCroy current probes includes models with bandwidths up to 100 MHz, peak currents up to 700 A and sensitivities to 1 mA/div. Teledyne LeCroy current probes are often used in applications such as the design and test of switching power supplies, motor drives, electric vehicles, and uninterruptible power supplies.

High Sensitivity

The CP030A and CP031A provide a high sensitivity of 1 mA/div. This allows for more precise low current measurements on Teledyne LeCroy oscilloscopes. When used with HDO high definition oscilloscopes with HD4096 technology, users will obtain highly accurate, low current waveforms with unmatched 12-bit resolution for improved debug and analysis.

Fully Integrated

All Teledyne LeCroy current probes are powered through the Teledyne LeCroy ProBus® connection and require no additional hardware. Along with providing power, the ProBus connection allows the current probe and oscilloscope to communicate, resulting in current waveforms automatically displayed on screen in Amps, and calculated power traces scaled correctly in Watts. This full integration also allows for Degauss and Autozero functions to be done directly from the oscilloscope's user interface.

Deskew Calibration Source

The DCS015 deskew calibration source has both voltage and current time-aligned signals, which enables the precise deskew of voltage and current probes. Most voltage probes along with the CP030, CP030A, CP031, and CP031A are compatible with the DSC025.

Teledyne LeCroy Current Probe and Adapter Model Numbers:

CP030
CP030A
CP031
CP031A
CP150
CP500
DCS025
CA10

Opposite page:
CP031, 30A, 100 MHz Current Probe.

Teledyne LeCroy Current Probe and Adapter Model Numbers:

CP030
CP030A
CP031
CP031A
CP150
CP500
DCS025
CA10

Key Features

- **ProBus active probe interface withautomatic scaling in A/div**
- **Autozero and degauss capabilities built into instrument's user interface**
- **Wide range of input currents and bandwidth capabilities**

CP030
- 30 A_{rms} continuous current
- 50 A_{peak} current
- 50 MHz bandwidth

CP030A
- 30 A_{rms} continuous current
- 50 A_{peak} current
- 50 MHz bandwidth
- 1 mA/div sensitivity

CP031
- 30 A_{rms} continuous current
- 50 A_{peak} current
- 100 MHz bandwidth

CP031A
- 30 A_{rms} continuous current
- 50 A_{peak} current
- 100 MHz bandwidth
- 1 mA/div sensitivity

CP150
- 150 A_{rms} continuous current
- 500 A_{peak} current
- 10 MHz bandwidth

CP500
- 500 A_{rms} continuous current
- 700 A_{peak} current
- 2 MHz bandwidth

DCS025
- Precise deskew of voltage and current probes.
- Compatible with the CP030, CP030A, CP031, CP031A, AP015, CP150, and CP500

CA10 Current Sensor Adapter

The CA10 enables a third-party current measurement device to operate like a Teledyne LeCroy probe. The CA10 is programmable and customizable to work with third-party current measurement devices that output voltage or current signals proportional to measured current. *(See page 50 for more information and specifications).*

Specifications

Electrical Characteristics*	CP030 (CP030-3M)	CP030A	CP031	CP031A	CP150 (CP150-6M)	CP500
Max. Continuous Input Current	30 A_{rms}				150 A_{rms}	500 A_{rms}
Bandwidth	50 MHz (10 MHz)		100 MHz		10 MHz (5 MHz)	2 MHz
Rise Time (typical)	≤ 7 ns (≤ 35 ns)		≤ 3.5 ns		≤ 35 ns (≤ 70 ns)	≤ 175 ns
Max. Peak Current	50 A_{peak} (non-continuous)				300 A_{peak} (non-continuous); 500 Apeak ≤ 30 µs	700 A_{peak} (non-continuous)
Output Voltage	0.1 V/A	0.1 V/A & 1 V/A	0.1 V/A	0.1 V/A & 1 V/A	0.01 V/A	
Max Continuous Input Current at 1 V/A (100mA/div or less)	–	5 A	–	5 A	–	
Offset Range at 1V/A (100mA/div or less)	–	±5 A	–	±5 A	–	
Minimum Sensitivity	10 mA/div	1 mA/div	10 mA/div	1 mA/div	100 mA/div	
Low-Frequency Accuracy	1%					
AC Noise at 20 MHz BWL	≤ 2.5 mA	≤ 150 µA	≤ 2.5 mA	≤ 150 µA	≤ 6.0 mA	≤ 8.0 mA
Coupling	AC, DC, GND					

General Characteristics

Cable Length	1.5 m (3 m)	1.5 m			2 m (6 m)	6 m
Weight	240 g (290 g)	260 g	240 g	260 g	500 g (600 g)	630 g
Max. Conductor Size (Diameter)	5 mm				20 mm	
Interface	ProBus, 1 MΩ only					
Usage Environment	Indoor					
Operating Temperature	0˚ C to 40˚ C					
Max. Relative Humidity	80%					
Max. Altitude	2000 m					
Measurement Category	No rated measurement category**				No rated measurement category**	

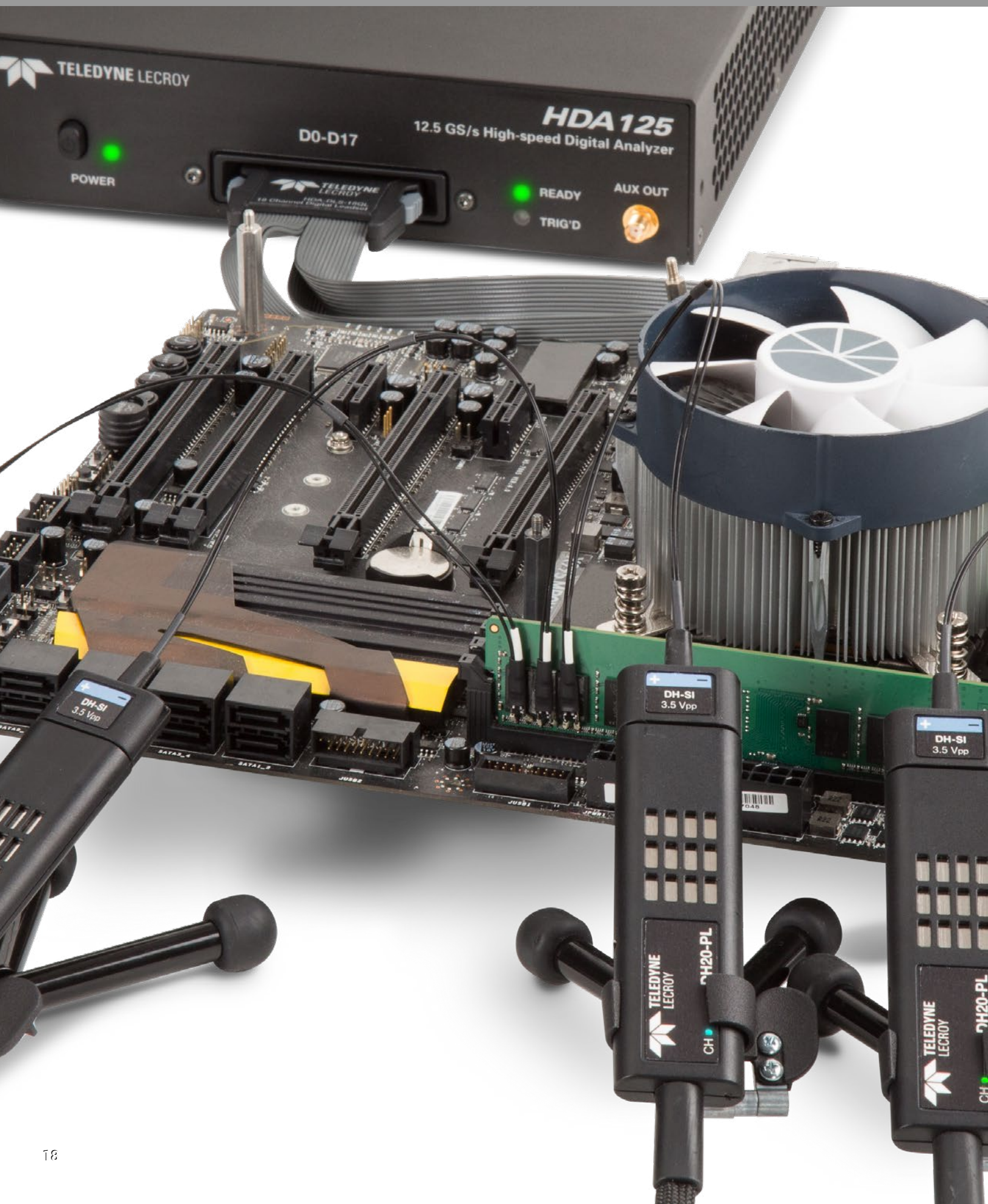
** Electrical Characteristics Guaranteed at 23 °C ±3 °C. Values are based on oscilloscopes with 1 mV/div sensitivity. Numbers will be higher on instruments with lower sensitivity.*

*** Not intended for measurements on circuits directly connected to Mains supply or within Measurement Categories II, III, or IV.*

CP03x, CP150, and CP500 probes (and long cable versions of these) are compatible with any Teledyne LeCroy oscilloscope with a ProBus interface running firmware version 4.3.1.1 or greater. CP03xA probes are compatible with most Teledyne LeCroy oscilloscopes with a ProBus interface running X-Stream™ firmware version 7.8.x.x or later.

Ordering Information

Product Description	Product Code
ProBus Current Sensor Adapter	CA10
Set of 4 CA10, ProBus Current Sensor Adapters	CA10-QUADPAK
30 A; 50 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A Peak Pulse, 1.5 meter cable	CP030
30A; 10 MHz Current Probe - AC/DC, 30 Arms; 50 A Peak Pulse, 3 meter cable (not EMC compliant)	CP030-3M
30 A; 50 MHz High Sensitivity Current Probe – AC/DC; 30 A_{rms}; 50 A Peak Pulse, 1.5 meter cable	CP030A
30 A; 100 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A Peak Pulse, 1.5 meter cable	CP031
30 A; 100 MHz High Sensitivity Current Probe – AC/DC; 30 A_{rms}; 50 A Peak Pulse, 1.5 meter cable	CP031A
150 A; 10 MHz Current Probe – AC/DC; 150 A_{rms}; 500 A Peak Pulse, 2 meter cable	CP150
150 A; 5 MHz Current Probe – AC/DC; 150 Arms; 500 A Peak Pulse, 6 meter cable (not EMC compliant)	CP150-6M
500 A; 2 MHz Current Probe – AC/DC; 500 A_{rms}; 700 A Peak Pulse, 6 meter cable	CP500
Deskew Calibration Source for CP030, CP030A, CP031, CP031A, AP015, CP150, CP500	DCS025


TELEDYNE LECROY
HDA125
12.5 GS/s High-speed Digital Analyzer
D0-D17
POWER
READY
TRIG'D
AUX OUT
DH-SI
3.5 Vpp
TELEDYNE LECROY
CH

Our differential probes are general purpose high-bandwidth probes with high dynamic range and offset. Wide variety of tips and leads are available, including solder-in, QuickLink solder-in, HiTemp solder-in, browser tip, square-pin, and SMA/SMP lead.

Opposite page:
DH Series Probes shown with HDA125.

Teledyne LeCroy Differential Probe Model Numbers:

≤ 1.5 GHz
ZD200
ZD500
ZD1000
ZD1500
AP033

4 GHz - 6 GHz
D410-A-PB2
D420-A-PB2
D400A-AT-PB2
D610-A-PB2
D610-A-PL
D620-A-PB2
D620-A-PL
D600A-AT-PB2
D600A-AT-PL

8 GHz - 13 GHz
D830-PB2
D830-PL
D1330-PL

8 GHz - 30 GHz
DH08-PB2
DH08-PL
DH13-PL
DH16-PL
DH20-PL
DH25-2.92MM
DH30-2.92MM

≤ 1.5 GHz DIFFERENTIAL PROBES

Teledyne LeCroy
≤1.5 GHz
Differential Probe
Model Numbers:

ZD200
ZD500
ZD1000
ZD1500
AP033

The ZD Series probes provide wide dynamic range, excellent noise and loading performance and an extensive set of probe tips, leads, and ground accessories to handle a wide range of probing scenarios. The low 1 pF capacitance means this probe is ideal for all frequencies. The ZD Series differential probes provide full system bandwidth for all Teledyne LeCroy Oscilloscopes 1.5 GHz and lower.

Fully Integrated

With the ProBus interface, the ZD500, 1000, and 1500 become an integral part of the oscilloscope. All probe gain and offset controls are transparent to the user, making it easier to probe the circuit without concern for which gain setting to choose. When used with a Teledyne LeCroy digital oscilloscope, no external power supply is required.

Wide Dynamic Range

The ZD500, 1000, 1500 probes provide transparent probe attenuation so signals are always optimized for the display. The differential range is 18 V_{p-p} with a differential offset of ±8V and common mode range of ±10 V, making these probes versatile for every probing application.

Wide Applications

The wide dynamic range of 16 V_{p-p} and offset range of ±8V suit this probe to a wide range of applications and signal types. The ZD differential probes are ideally suited for Automotive, Serial Data, power, and general purpose use.

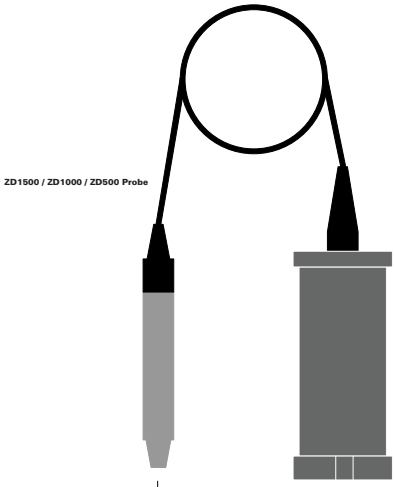
Specifications

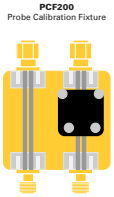
Electrical Characteristics

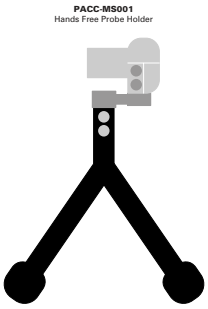
	ZD200	ZD500	ZD1000	ZD1500
Bandwidth (Warranted)	200 MHz	500 MHz	1000 MHz	1500 MHz
Bandwidth (Typical)	-	650 MHz	1200 MHz	1700 MHz
Risetime 10–90% (Typical)	1.75 ns	650 ps	375 ps	270 ps
Risetime 20–80% (Typical)	-	500 ps	280 ps	200 ps
LF Attenuation Accuracy (Warranted)	1%	2%		
Zero Offset (Typical) (within 15 minutes after autozero)	-	5 mV		
System Noise (Typical)	-	1.3 mV_{rms}	1.75 mV_{rms}	
Probe Noise Density (Typical)	3 mV_{rms}	38 nV/rt (Hz)		
Input Differential Range (Nominal)	± 20 V	±8 V (16 V_{p-p})		
Differential Offset Range (Nominal)	-	±18 V		
Offset Gain Accuracy (Typical)	-	2%		
Common Mode Range (Nominal)	± 60 V	±10 V		
Maximum Non-destruct Voltage (Nominal)	-	30 V		
CMRR (Typical)	80 dB @ 60 Hz 50 dB@10 MHz	60 dB 50/60 Hz 30 dB 20 MHz 25 dB 500 MHz	60 dB 50/60 Hz 30 dB 20 MHz 25 dB @ 1000 MHz	60 dB 50/60 Hz 30 dB 20 MHz 25 dB @ 1500 MHz
DC Input Resistance (Nominal)	250 kΩ (Common Mode) 1 MΩ (Differential Mode)	50 kΩ (Common Mode) 120 kΩ (Differential Mode)		
Differential Input Capacitance (Typical)	3.5 pF	< 1.0 pF		

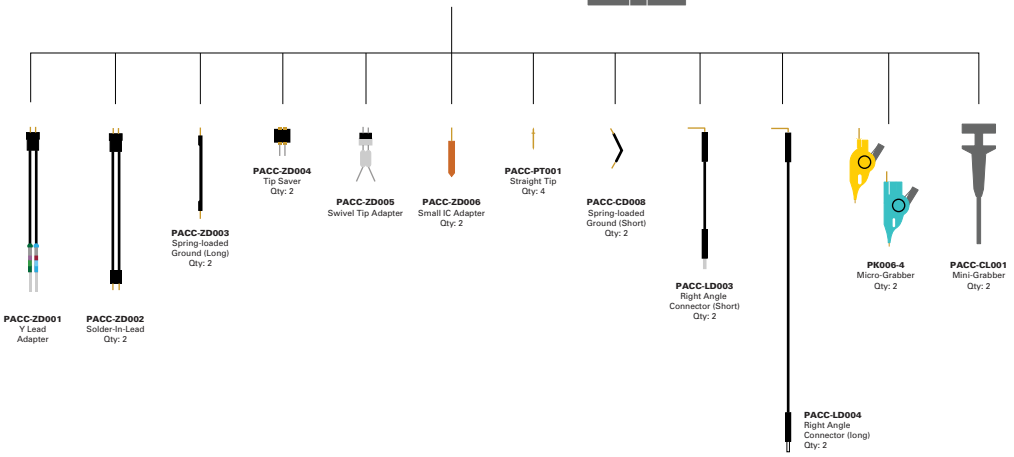
Ordering Information

Product Description	Product Code
200 MHz, 3.5 pF, 1 MΩ Active Differential Probe	ZD200
500 MHz, 1.0 pF Active Differential Probe, ±8 V	ZD500
1 GHz, 1.0 pF Active Differential Probe, ±8 V	ZD1000
1.5 GHz, 1.0 pF Active Differential Probe, ±8 V	ZD1500









AP033

High bandwidth, excellent common-mode rejection ratio (CMRR) and low noise make these active differential probes ideal for applications such as disk drive design and failure analysis, as well as wireless and data communication design.

Specifications

Bandwidth	500 MHz
Gain	x10, x1, ÷10 (÷100 with plug-on ÷10 attenuator)
DC Accuracy	1% in x1 without external attenuator
Input Resistance	1 MΩ each input to ground 2 MΩ differential between inputs
Differential Mode Range	±400 mV (x1) ±40 mV (x10) ±4 V (÷10) ±40 V (÷100)
Offset Range	±400 mV (x1, x10) ±4 V (±10) ±40 V (±100)
Common-Mode Range	±42 V peak (±10) +4.2 V peak (±100)
CMRR	70 Hz 10,000:1 (80 dB) 100 kHz 10,000:1 (80 dB) 1 MHz 1000:1 (60 dB) 10 MHz 100:1 (40 dB) 250 MHz 5:1 (14 dB)

Ordering Information

Product Description	Product Code
500 MHz Differential Probe	AP033

4 GHz - 6 GHz DIFFERENTIAL PROBES

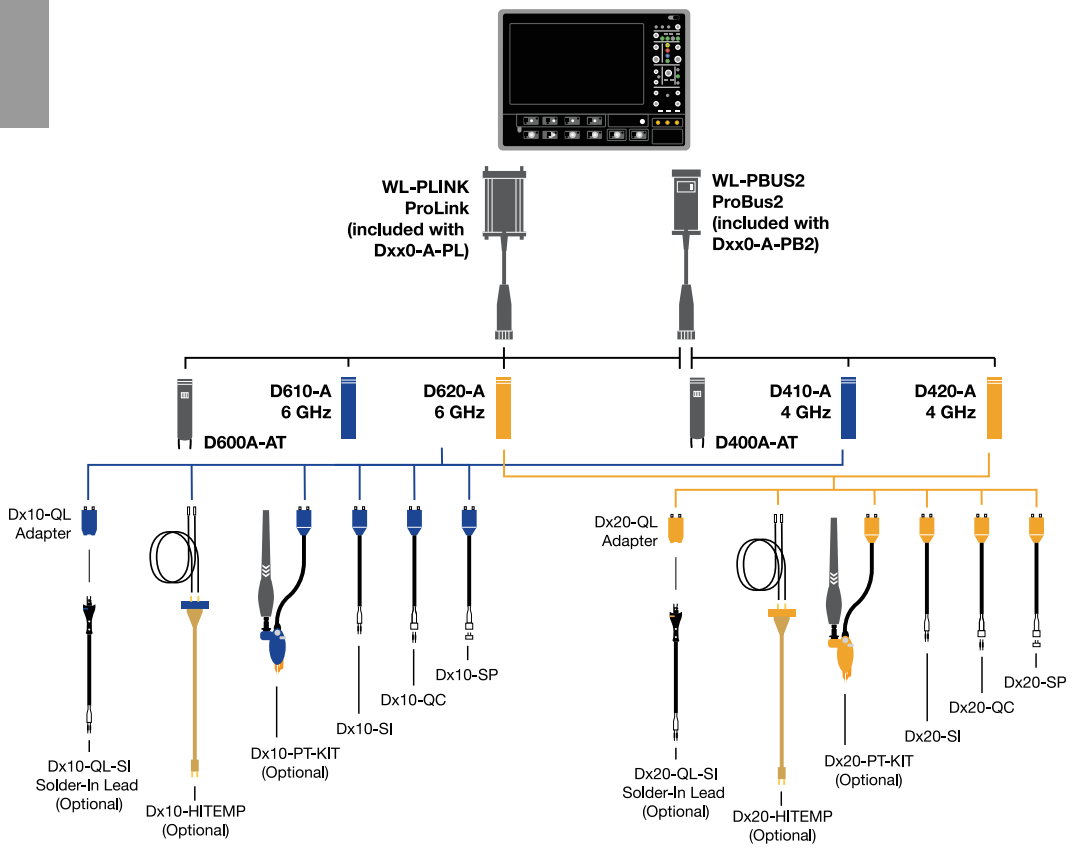
Teledyne LeCroy
4 GHz - 6 GHz
Differential Probe
Model Numbers:

D410-A-PB2
D420-A-PB2
D400A-AT-PB2
D610-A-PB2
D610-A-PL
D620-A-PB2
D620-A-PL
D600A-AT-PB2
D600A-AT-PL

Teledyne LeCroy's WaveLink 4-6 GHz Differential Probes are a general purpose probing solution with high-input dynamic range and offset range capability. The range of capabilities is ideal for a variety of high-speed DDR signals where high dynamic range and large offset requirements are common.

Key Features

- **4 GHz or 6 GHz models**
- **Up to 5 Vpk-pk dynamic range with low noise**
- **±3 V offset range**
- **Ideal for DDR2, LPDDR2, DDR3**
- **Innovative QuickLink architecture**
- **Wide variety of tips and leads**
  - Solder-In Lead
  - QuickLink Solder-In Lead
  - Positioner (Browser) Tip
  - Adjustable (Browser) Tip
  - Quick Connect Lead
  - Square Pin Lead
  - Hi-Temp Solder-In Lead
- **Low loading and high impedance for minimal signal disturbance**
- **Deluxe soft carrying case**



4 GHz - 6 GHz DIFFERENTIAL PROBES

	D610-A-PB2, D610-A-PL	D620-A-PB2, D620-A-PL	D410-A-PB2	D420-A-PB2	D600A-AT-PB2, D600A-AT-PL	D400A-AT-PB2
Bandwidth* (Probe only, guaranteed) (System bandwidth, typical)	**Dx10-SI, Dx10-QL-SI and Dx10-PT Tips** 6 GHz **Dx10-HiTemp** 5 GHz **Dx10-QC Tip** 4 GHz **Dx10-SP Tip** 3 GHz	**Dx20-SI, Dx20-QL-SI and Dx20-PT Tips** 6 GHz **Dx20-HiTemp** 5 GHz **Dx20-QC Tip** 4 GHz **Dx20-SP Tip** 3 GHz	**Dx10-SI, Dx10-QL-SI, Dx10-HiTemp, Dx10-QC and Dx10-PT Tips** 4 GHz **Dx10-SP Tip** 3 GHz	**Dx20-SI, Dx20-QL-SI, Dx20-HiTemp, Dx20-QC and Dx20-PT Tips** 4 GHz **Dx20-SP Tip** 3 GHz	6 GHz	4 GHz
Rise Time* (10–90%)	**Dx10-SI, Dx10-QL-SI and Dx10-PT Tips** 75 ps (typical) **Dx10-HiTemp** 90 ps (typical) **Dx10-QC Tip** 122.5 ps (typical) **Dx10-SP Tip** 150 ps (typical)	**Dx20-SI, Dx20-QL-SI and Dx20-PT Tips** 75 ps (typical) **Dx20-HiTemp** 90 ps (typical) **Dx20-QC Tip** 122.5 ps (typical) **Dx20-SP Tip** 150 ps (typical)	**Dx10-SI, Dx10-QL-SI, Dx10-HiTemp, and Dx10-PT Tips** 112 ps (typical) **Dx10-QC Tip** 122.5 ps (typical) **Dx10-SP Tip** 150 ps (typical)	**Dx20-SI, Dx20-QL-SI, Dx20-HiTemp, and Dx20-PT Tips** 112 ps (typical) **Dx20-QC Tip** 122.5 ps (typical) **Dx20-SP Tip** 150 ps (typical)	<75 ps (typical)	<112 ps (typical)
Rise Time* (20–80%)	**Dx10-SI, Dx10-QL-SI and Dx10-PT Tips** 56 ps (typical) **Dx10-HiTemp** 67.5 ps (typical) **Dx10-QC Tip** 92 ps (typical) **Dx10-SP Tip** 113 ps (typical)	**Dx20-SI, Dx20-QL-SI and Dx20-PT Tips** 56 ps (typical) **Dx20-HiTemp** 67.5 ps (typical) **Dx20-QC Tip** 92 ps (typical) **Dx20-SP Tip** 113 ps (typical)	**Dx10-SI, Dx10-QL-SI, Dx10-HiTemp, and Dx10-PT Tips** 84 ps (typical) **Dx10-QC Tip** 92 ps (typical) **Dx10-SP Tip** 113 ps (typical)	**Dx20-SI, Dx20-QL-SI, Dx20-HiTemp, and Dx20-PT Tips** 84 ps (typical) **Dx20-QC Tip** 92 ps (typical) **Dx20-SP Tip** 113 ps (typical)	56 ps (typical)	84 ps (typical)
Noise (System)	<36 nV/√Hz ($2.8\ mV_{rms}$) (typical) Referred to input, 6 GHz bandwidth	<61 nV/√Hz ($4.8\ mV_{rms}$) (typical) Referred to input, 6 GHz bandwidth	<36 nV/√Hz ($2.3\ mV_{rms}$) (typical) Referred to input, 4 GHz bandwidth	<67 nV/√Hz ($4.3\ mV_{rms}$) (typical) Referred to input, 4 GHz bandwidth	<74 nV/√Hz ($5.8\ mV_{rms}$) (typical) Referred to input, 6 GHz bandwidth	<74 nV/√Hz ($4.7\ mV_{rms}$) (typical) Referred to input, 4 GHz bandwidth
Input						
Input Dynamic Range (Nominal)	$2.5V_{pk\text{-}pk}$, ±1.25V	$5V_{pk\text{-}pk}$, ±2.5V	$2.5V_{pk\text{-}pk}$, ±1.25V	$5V_{pk\text{-}pk}$, ±2.5V	$4.8V_{pk\text{-}pk}$, ±2.4V	
Input Common Mode Voltage Range (Nominal)	±4 V				±2.4 Vmax	
Input Offset Voltage Range	±3 V Differential (nominal)				n/a	
Non-destructive Input Range (Nominal)	±20 V				±18 V	
Attenuation	1.7X / 1.0X (nominal)	3.2X / 1.9X (nominal)	1.7X / 1.0X (nominal)	3.2X / 1.9X (nominal)	2.5X	
DC Input Resistance (Nominal)	200 kΩ Differential 50 kΩ Common Mode				4 kΩ Differential 1 kΩ Common Mode	

** All Bandwidth and Rise Time measurements are made with an oscilloscope bandwidth greater or equal to the probe bandwidth*
† Through entire frequency range

Product Description	Product Code
Complete Differential Probes	
4 GHz ProBus2 Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D410-A-PB2
4 GHz ProLink Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D410-A-PL
4 GHz ProBus2 Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D420-A-PB2
4 GHz ProLink Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D420-A-PL
6 GHz ProBus2 Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D610-A-PB2
6 GHz ProLink Differential Probe with Dx10-SI Solder-In Tip (Qty. 1), Dx10-SP Square Pin (Qty. 1), and Dx10-QC Quick Connect (Qty. 1)	D610-A-PL
6 GHz ProBus2 Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D620-A-PB2
6 GHz ProLink Differential Probe with Dx20-SI Solder-In Tip (Qty. 1), Dx20-SP Square Pin (Qty. 1), and Dx20-QC Quick Connect (Qty. 1)	D620-A-PL
4 GHz ProBus2 Differential Probe with Adjustable Tip	D400A-AT-PB2
6 GHz ProBus2 Differential Probe with Adjustable Tip	D600A-AT-PB2
6 GHz ProLink Differential Probe with Adjustable Tip	D600A-AT-PL
Positioner Tip (Browser) Kits	
WaveLink Dx10-PT Adjustable Positioner Tip Kit. For use with Dx10 amplifiers.	Dx10-PT-KIT
WaveLink Dx20-PT Adjustable Positioner Tip Kit. For use with Dx20 amplifiers.	Dx20-PT-KIT
QuickLink Solder-In Tip Set	
QuickLink Solder-In starter pack for use with Dx10 amplifier. Includes one QuickLink adapter and three QL-SI tips.	Dx10-QL-3SI
QuickLink Solder-In starter pack for use with Dx20 amplifier. Includes one QuickLink adapter and three QL-SI tips.	Dx20-QL-3SI

Product Description	Product Code
Accessories	
Probe Deskew and Calibration Test Fixture	TF-DSQ
Calibration Options	
NIST Calibration for D410-A. Includes test data.	D410-A-CCNIST
NIST Calibration for D420-A. Includes test data.	D420-A-CCNIST
NIST Calibration for D610-A. Includes test data.	D610-A-CCNIST
NIST Calibration for D620-A. Includes test data.	D620-A-CCNIST
NIST Calibration for D400A-AT. Includes test data.	D400A-AT-CCNIST
NIST Calibration for D600A-AT. Includes test data.	D600A-AT-CCNIST
Replacement Parts	
Single replacement QuickLink Solder-In Tip	QL-SI-1Pack
9-pack of replacement QuickLink Solder-In Tip	QL-SI-9Pack
Replacement Dx10-SI 4 & 6 GHz Solder-In Lead with Qty. 5 Spare Resistors.	Dx10-SI
Replacement Dx20-SI 4 & 6 GHz Solder-In Lead with Qty. 5 Spare Resistors.	Dx20-SI
Replacement Dx10-QC 4 & 6 GHz Quick Connect Lead	Dx10-QC
Replacement Dx20-QC 4 & 6 GHz Quick Connect Lead	Dx20-QC
Replacement Dx10-SP 4 & 6 GHz Square Pin Lead	Dx10-SP
Replacement Dx20-SP 4 & 6 GHz Square Pin Lead	Dx20-SP
Replacement SI Resistor Kit for Dx10/Dx20 - Kit of 20	PKxx0-SI
Replacement QC Resistor Kit for Dx10/Dx20 - 2 kits of 20	PKxx0-QC
Qty. 4 Replacement Pogo Pin Tips and Qty. 2 Replacement Sockets for Dx10-PT and Dx20-PT Adjustable Positioner Tips.	Dxx0-PT-TIPS
Replacement Probe Tip Holder Kit	PK600ST-3
Replacement Platform/Cable Assembly Mounting Kit	PK600ST-4
Quantity 1 Package of Black Adhesive Pads (10/pkg) and Quantity 1 Package of White Adhesive Pads (10/pkg)	Dxx0-PT-TAPE
Quantity 1 Package of Adhesive Probe Connection Guides (200 individual guides/package)	Dxx0-PT-GUIDES

8 GHz - 13 GHz DIFFERENTIAL PROBES

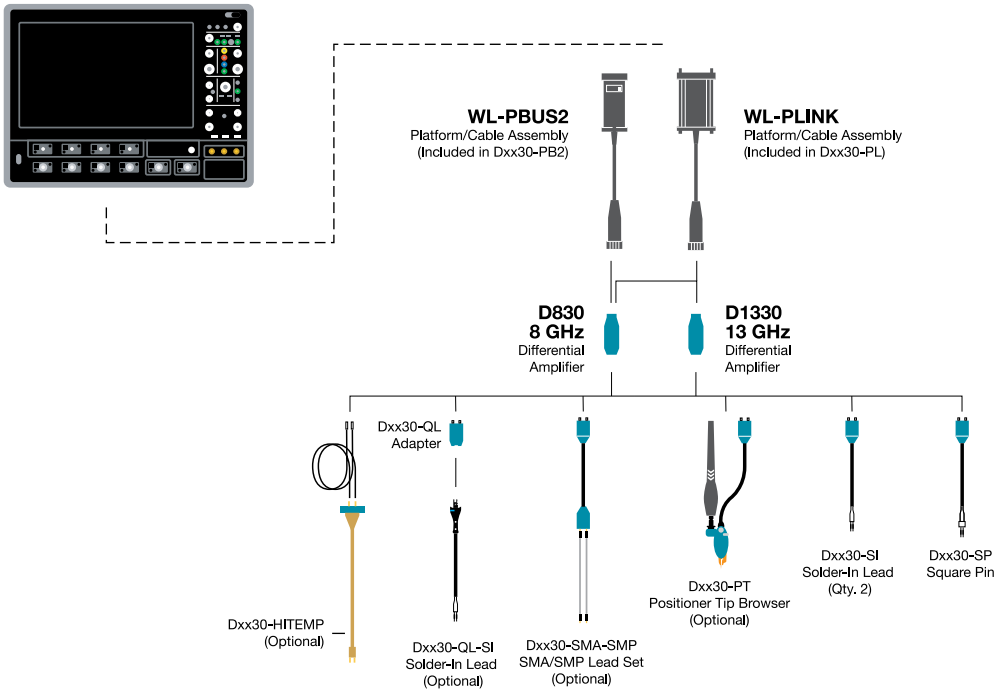
Teledyne LeCroy
8 GHz - 13 GHz
Differential Probe
Model Numbers:

D830-PB2
D830-PL
D1330-PL

The WaveLink Differential Probe Series is a 8-13 GHz bandwidth active differential probe series with high input dynamic range, a large offset capability, and a wide variety of tips and leads available for different applications.

Key Features

- Choice of 8 or 13 GHz bandwidth models
- 3.5 Vpk-pk dynamic range
- ±4 V offset range
- Ideal for DDR3, DDR4, LPDDR3
- Innovative QuickLink architecture
- Wide variety of tips and leads
  - Solder-In Lead
  - QuickLink Solder-In Lead
  - Positioner (Browser) Tip
  - SMA/SMP Lead
  - Square Pin Lead
  - Hi-Temp Solder-In Lead
- Low loading and high impedance for minimal signal disturbance
- Deluxe soft carrying case
- SMA/SMP lead set accessory does not require purchase of a different amplifier



	D830-PB2, D830-PL	D1330-PL
Bandwidth* (Probe only, guaranteed) (System bandwidth, typical)	**Dxx30-SI, Dxx30-QL-SI, Dxx30-SMA-SMP, Dxx30-HiTemp, and Dxx30-PT Tips** 8 GHz **Dxx30-SP Tip** 3 GHz	**Dxx30-SI and Dxx30-SMA-SMP Tips** 13 GHz **Dxx30-PT and Dxx30-HiTemp Tips** 10 GHz **Dxx30-QL-SI Tip** 8 GHz **Dxx30-SP Tip** 3 GHz
Rise Time* (10–90%)	**Dxx30-SI, Dxx30-QL-SI, Dxx30-SMA-SMP, Dxx30-HiTemp, and Dxx30-PT Tips** 50 ps (typical) **Dxx30-SP Tip** 132 ps (typical)	**Dxx30-SI and Dxx30-SMA-SMP Tips** 35 ps (typical) **Dxx30-PT and Dxx30-HiTemp Tips** 40 ps (typical) **Dxx30-QL-SI Tip** 50 ps (typical) **Dxx30-SP Tip** 132 ps (typical)
Rise Time* (20–80%)	**Dxx30-SI, Dxx30-QL-SI, Dxx30-SMA-SMP, Dxx30-HiTemp, and Dxx30-PT Tips** 37.5 ps (typical) **Dxx30-SP Tip** 100 ps (typical)	**Dxx30-SI and Dxx30-SMA-SMP Tips** 26 ps (typical) **Dxx30-PT and Dxx30-HiTemp Tips** 30 ps (typical) **Dxx30-QL-SI Tip** 37.5 ps (typical) **Dxx30-SP Tip** 100 ps (typical)
Noise (Probe)	<48 nV/√Hz (4.3 mVrms) (typical) Referred to input, 8 GHz bandwidth.	<48 nV/√Hz (5.5 mVrms) (typical) Referred to input, 13 GHz bandwidth.
Noise (System)	<52 nV/√Hz (4.6 mVrms) (typical) Referred to input, 8 GHz bandwidth.	<52nV/√Hz (5.9 mVrms) (typical) Referred to input, 13 GHz bandwidth.

Input

Input Dynamic Range	3.5Vpk-pk, ±1.75V (nominal)
Input Common Mode Voltage Range	±5 V (nominal)
Input Offset Voltage Range	±4 V Differential (nominal)
Non-destructive Input Range	±15 V (nominal)
Attenuation	3.75x (nominal)
DC Input Resistance (nominal)	200 kΩ Differential 50 kΩ Common mode
Impedance (Zmin, typical)	>250 Ω Differential through entire frequency range using SI tip
Impedance (mid-band, typical)	**Dxx30-SI, Dxx30-QL-SI, and Dxx30-HiTemp Tips** 470 Ω at 4 GHz, 320 Ω at 6 GHz, 260 Ω at 8 GHz, 250 Ω at 9 GHz, 260 Ω at 10 GHz, 350 Ω at 13 GHz **Dxx30-PT Tip** 155 Ω at 4 GHz, 210 Ω at 6 GHz, 140 Ω at 8 GHz, 80 Ω at 9 GHz, 40 Ω at 10 GHz
CMRR	58 dB DC / 100 Hz 38 dB to 10 MHz 30 dB to 3 GHz 20 dB to 8 GHz (typical)

** All Bandwidth and Rise Time measurements are made with an oscilloscope bandwidth greater or equal to the probe bandwidth*

Product Description	Product Code
Complete Differential Probes	
8 GHz ProBus2 Differential Probe with Dxx30-SI Solder-In Tip (Qty. 2) and Dxx30-SP Square Pin (Qty. 1)	D830-PB2
8 GHz ProLink Differential Probe with Dxx30-SI Solder-In Tip (Qty. 2) and Dxx30-SP Square Pin (Qty. 1)	D830-PL
13 GHz ProLink Differential Probe with Dxx30-SI Solder-In Tip (Qty. 2) and Dxx30-SP Square Pin (Qty. 1)	D1330-PL
Positioner Tip (Browser) Kits	
WaveLink Dxx30-PT (up to 10 GHz rating) Adjustable Positioner Tip Kit. For use with Dxx30 amplifiers.	Dxx30-PT-KIT
QuickLink Solder-In Tip Set	
QuickLink Solder-In starter pack for use with Dxx30 amplifier. Includes one QuickLink adapter and three QL-SI tips.	Dxx30-QL-3SI
Hi-Temp Lead Set	
WaveLink Temperature Extension Cables for Dxx30. Includes set of Matched 30" High Temperature Cables (Qty. 1) and solder-in lead set (Qty. 1).	Dxx30-HiTemp
SMA/SMP Lead Set	
SMA/SMP lead set for use with Dxx30 amplifiers. Includes a set of SMA leads, SMP leads, pair of DC blocks and SMA finger wrenches.	Dxx30-SMA-SMP-LEADS

Product Description	Product Code
Accessories	
Probe Deskew and Calibration Test Fixture	TF-DSQ
Calibration Options	
NIST Calibration for D830. Includes test data.	D830-CCNIST
NIST Calibration for D1330. Includes test data.	D1330-CCNIST
Replacement Parts	
Single replacement QuickLink Solder-In Tip	QL-SI-1Pack
9-pack of replacement QuickLink Solder-In Tip	QL-SI-9Pack
Replacement Dxx30-SP 8-13 GHz Square Pin Lead	Dxx30-SP
Replacement Dxx30-SI 8-13 GHz Solder-In Lead with Qty. 5 Spare Resistors.	Dxx30-SI
Replacement SI Resistor Kit for Dxx05-SI, Dxx30-QL-SI and Dxx30-SI Solder-In Tip - Kit of 5	Dxx05-SI-RESISTORS
Qty. 4 Replacement Pogo Pin Tips and Qty. 2 Replacement Sockets for Dx10-PT, Dx20-PT, and Dxx30-PT Adjustable Positioner Tips.	Dxx0-PT-TIPS
Replacement Probe Tip Holder Kit	PK600ST-3
Replacement Platform/Cable Assembly Mounting Kit	PK600ST-4
Quantity 1 Package of Black Adhesive Pads (10/pkg) and Quantity 1 Package of White Adhesive Pads (10/pkg)	Dxx0-PT-TAPE
Quantity 1 Package of Adhesive Probe Connection Guides (200 individual guides/package)	Dxx05-PT-GUIDES

8 GHz - 30 GHz DIFFERENTIAL PROBES

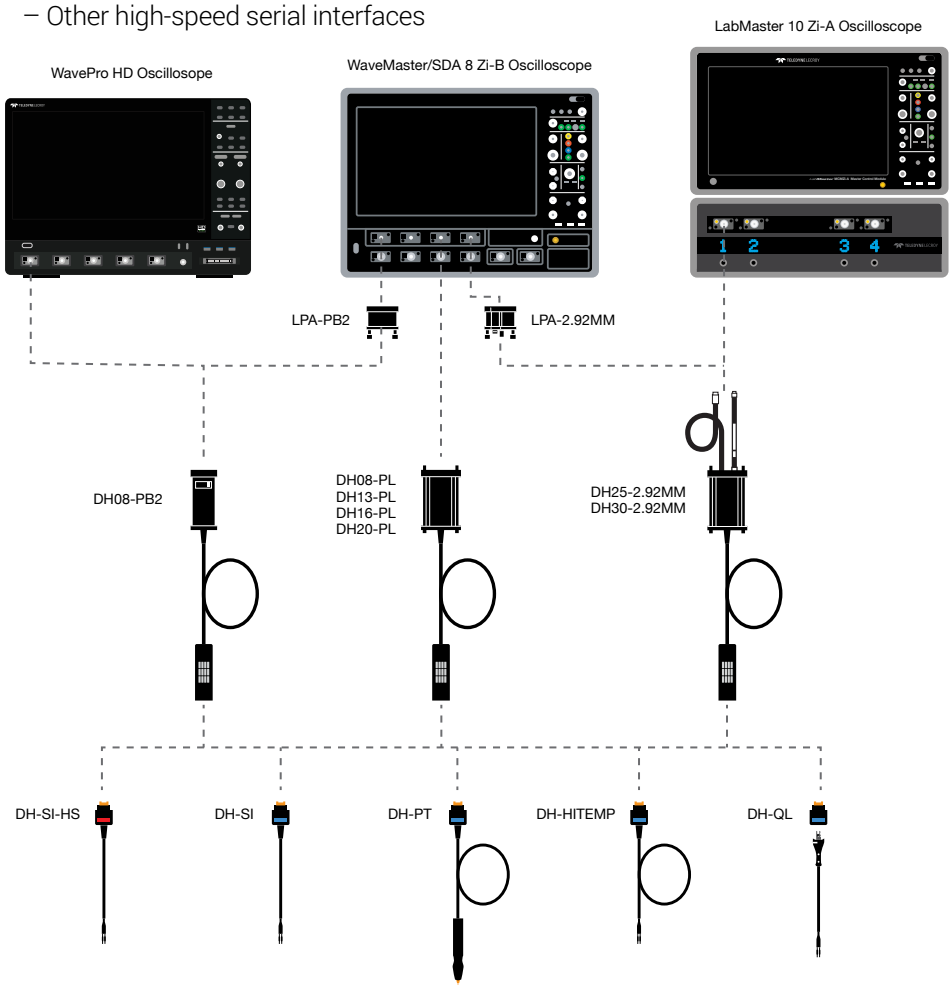
Teledyne LeCroy
8 GHz - 30 GHz
Differential Probe
Model Numbers:

DH08-PB2
DH08-PL
DH13-PL
DH16-PL
DH20-PL
DH25-2.92MM
DH30-2.92MM

The DH series of 8 to 30 GHz active differential probes provides high input dynamic range, large offset capability, low loading and excellent signal fidelity with a range of connection options.

Key Features

- **Bandwidth models from 8 GHz to 30 GHz**
- **Low loading and high impedance for minimal signal disturbance**
- **Wide variety of tips:**
  - Standard and high-sensitivity 30 GHz solder-in tips
  - High-temperature solder-in tip with 1-meter lead
  - QuickLink adapter for mixed-signal probing
  - Handheld browser tip
- **Built-in tip identification for simple setup and precise signal reproduction**
- **Ideal for debug and validation of:**
  - DDR3/LPDDR3
  - DDR4/LPDDR4
  - DDR5/LPDDR5
  - Other high-speed serial interfaces



8 GHz - 30 GHz DIFFERENTIAL PROBES

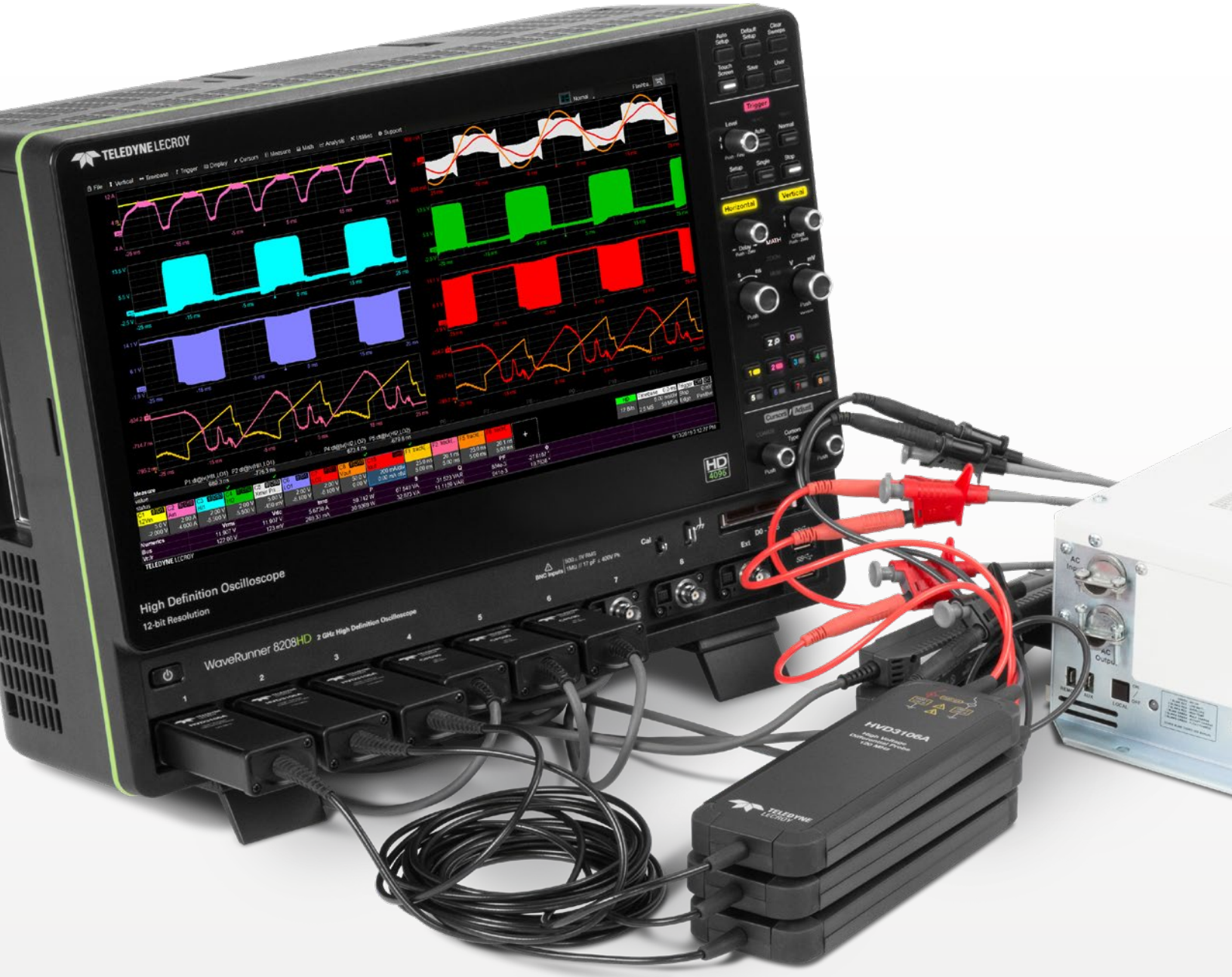
	DH08	DH13	DH16	DH20	DH25	DH30
Bandwidth						
Bandwidth (probe only)	8 GHz	13 GHz	16 GHz	20 GHz	25 GHz	30 GHz
Bandwidth with DH-SI or DH-SI-HS tip	8 GHz	13 GHz	16 GHz	20 GHz	25 GHz	30 GHz
Bandwidth with DH-HITEMP tip	8 GHz	13 GHz	16 GHz	16 GHz	16 GHz	16 GHz
Bandwidth with DH-PT browser	8 GHz	13 GHz	16 GHz	16 GHz	16 GHz	16 GHz
Bandwidth with DH-QL adapter and QL-SI tip	8 GHz	8 GHz	8 GHz	8 GHz	8 GHz	8 GHz
Rise Time*						
Rise Time (10-90%)	56 ps	34.5 ps	28 ps	22.5 ps	18 ps	15 ps
Rise Time (20-80%)	37.5 ps	23 ps	19 ps	15 ps	12 ps	10 ps
Probe noise (referred to input)*						
With DH-SI-HS tip	2.1 mV_{rms}	2.2 mV_{rms}	2.3 mV_{rms}	2.6 mV_{rms}	2.9 mV_{rms}	3.2 mV_{rms}
With all other tips	3.5 mV_{rms}	3.8 mV_{rms}	4.2 mV_{rms}	4.6 mV_{rms}	4.8 mV_{rms}	5.0 mV_{rms}
Probe noise density (referred to input)						
With DH-SI-HS tip	18 nV/rt(Hz)					
With all other tips	30 nV/rt(Hz)					
Input						
Input Dynamic Range						
With DH-SI-HS tip	2.0 Vpp (±1.0 V)					
With all other tips	3.5 Vpp (±1.75 V)					
Input Common Mode Voltage Range	±5.0 V					
Input Offset Voltage Range	±4.0 V					
Non-destructive Input Range	±16 V					
Attenuation						
With DH-SI-HS tip	1.8x / 3.2x (selected automatically by oscilloscope software)					
With all other tips	3.2x / 5.8x (selected automatically by oscilloscope software)					
Attenuation Accuracy	±2%					
DC Input Resistance (nominal)						
Differential	200 kΩ differential					
Common mode	50 kΩ differential					
Input Resistance > 10 kHz (typical)						
With DH-SI-HS tip	1100 Ω differential					
With all other tips	2100 Ω differential					
Environmental						
Temperature						
Non-operating	-40 °C to 70 °C					
Operating (DH-HITEMP tip)	-40 °C to 125 °C					

** All Rise Time and Probe noise measurements are made using a full-bandwidth solder-in tip, and with an oscilloscope bandwidth greater than or equal to the probe bandwidth. When using other tips, rise time and noise measurements correspond to those of the equivalent-bandwidth probe model with a DH-SI tip.*

Product Description	Product Code
Differential Probes (tips not included)	
8 GHz differential probe with ProBus2 interface	DH08-PB2
8 GHz differential probe with ProLink interface	DH08-PL
13 GHz differential probe with ProLink interface	DH13-PL
16 GHz differential probe with ProLink interface	DH16-PL
20 GHz differential probe with ProLink interface	DH20-PL
25 GHz differential probe with 2.92 mm interface	DH25-2.92MM
30 GHz differential probe with 2.92 mm interface	DH30-2.92MM
Solder-in Tips	
DH series solder-in tip, 30 GHz BW, 3.5 Vpp range	DH-SI
DH series high-sensitivity solder-in tip, 30 GHz BW, 2.0 Vpp range	DH-SI-HS
Positioner (Browser) Tips	
DH series PT browser tip, 16 GHz BW, 3.5 Vpp range	DH-PT
High-temperature Tips	
DH series high-temperature solder-in tip, 16 GHz BW, 3.5 Vpp range	DH-HITEMP
QuickLink Adapters and Kits	
DH series QuickLink adapter, 8 GHz BW	DH-QL
DH series QuickLink adapter kit with 3 x QL-SI tips	DH-QL-3SI
Accessories	
ProLink to 2.92 mm adapter with probe power and communication pass through	LPA-2.92
2.92 mm to ProLink adapter with probe power and communication pass through	L2.92A-PLINK

Product Description	Product Code
Calibration Options	
3-year warranty	DH08-W3, DH13-W3, DH16-W3, DH20-W3, DH25-W3, DH30-W3
5-year warranty	DH08-W5, DH13-W5, DH16-W5, DH20-W5, DH25-W5, DH30-W5
3-year annual NIST calibration	DH08-C3, DH13-C3, DH16-C3, DH20-C3, DH25-C3, DH30-C3
5-year annual NIST calibration	DH08-C5, DH13-C5, DH16-C5, DH20-C5, DH25-C5, DH30-C5
3-year warranty with annual NIST calibration	DH08-T3, DH13-T3, DH16-T3, DH20-T3, DH25-T3, DH30-T3
5-year warranty with annual NIST calibration	DH08-T5, DH13-T5, DH16-T5, DH20-T5, DH25-T5, DH30-T5
NIST traceable calibration with test data	DH08-CCNIST, DH13-CCNIST, DH16-CCNIST, DH20-CCNIST, DH25-CCNIST, DH30-CCNIST
Replacement Parts	
Replacement SI resistor kit for DH-SI and DH-SI-HS solder-in tips	DH-SI-RESISTORS

HIGH VOLTAGE DIFFERENTIAL PROBES



High voltage differential probes provide high CMRR over a broad frequency range to simplify the measurement challenges found in noisy, high common-mode power electronics environments. The probe's design is easy-to-use and enables safe, precise high voltage floating measurements.

Teledyne LeCroy High Voltage Differential Probe Model Numbers:

HVD3102A
HVD3106A
HVD3106A-6M
HVD3206A
HVD3206A-6M
HVD3220
HVD3605A
AP031

Opposite page:
HVD3000A Series High Voltage Differential Probes with a WaveRunner 8000HD High Definition Oscilloscope.

HIGH VOLTAGE DIFFERENTIAL PROBES

Teledyne LeCroy High Voltage Differential Probe Model Numbers:

HVD3102A
HVD3106A
HVD3106A-6M
HVD3206A
HVD3206A-6M
HVD3220
HVD3605A

The HVD3000A series high voltage differential probes provide high CMRR over a broad frequency range to simplify the measurement challenges found in noisy, high common-mode power electronics environments. The probe's design is easy-to-use and enables safe, precise high voltage floating measurements.

Key Features

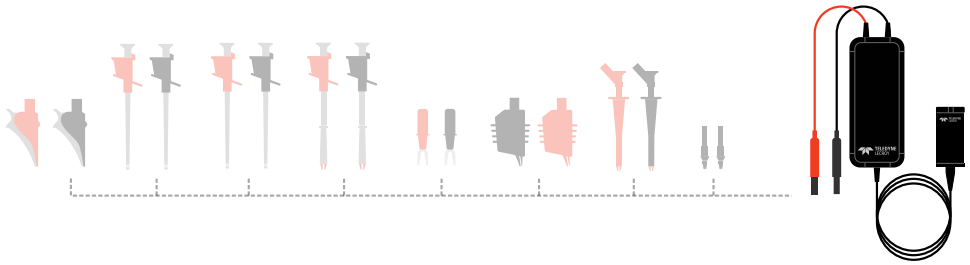
- **1 kV, 2 kV, 6 kV CAT safety rated models**
- **Widest differential voltage ranges available**
- **Exceptional common-mode rejection ratio (CMRR) across a broad frequency range**
- **1% gain accuracy**
- **High offset capability at both high and low attenuation**
- **AC and DC coupling**
- **ProBus active probe interface with automatic scaling**
- **AutoZero with auto disconnect switch**
- **Wide oscilloscope compatibility**

HIGH VOLTAGE DIFFERENTIAL PROBES

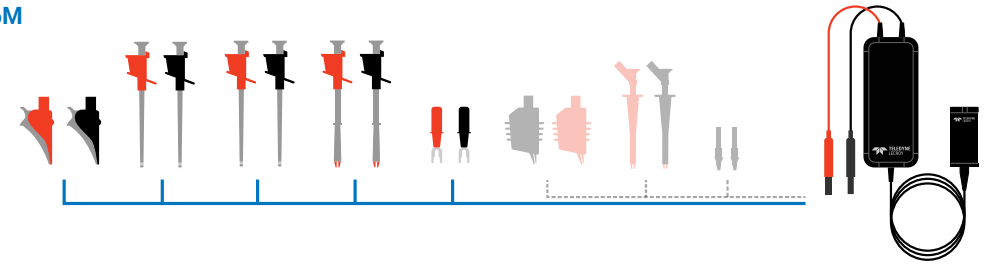
	HVD3102A	HVD3106A/ HVD3106A-6M	HVD3206A/ HVD3206A-6M	HVD3220	HVD3605A
Bandwidth	25 MHz	120 MHz/ 80 MHz	120 MHz/ 80 MHz	400 MHz	100 MHz
Differential Voltage Range	1500 V (DC + peak AC) (1750V maximum typical measurable before saturation)	1500 V (DC + peak AC) (2000V maximum typical measurable before saturation)	2000 V (DC + peak AC)		7000 V (DC + peak AC) (7600 V maximum typical measurable before saturation)
Max Safe Input Voltage	1000 V_{rms} CAT III		2000 V (DC + peak AC) CAT I 1500 Vdc CAT III 1000 Vrms CAT III		8485 V (DC + peak AC) CAT I 6000 V_{rms} CAT I 1000 V_{rms} CAT III 1000 V_{dc} CAT III
Gain Accuracy	1%*				
Cable Length	2.25 meters	2.25 meters/ 6.8 meters	2.25 meters/ 6.8 meters	2 meters	6.8 meters
Included Tip Accessories	Yes				

**Up to 0.35% on HVD3220*

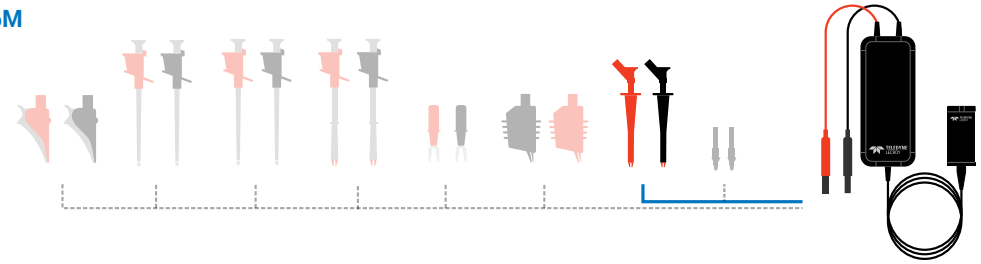
HVD310xA-NOACC



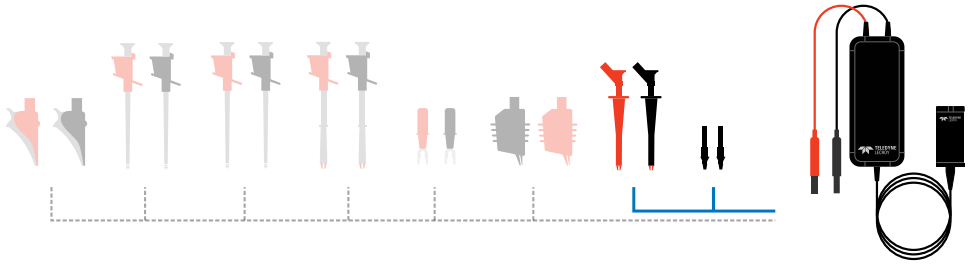
HVD310xA / 310xA-6M



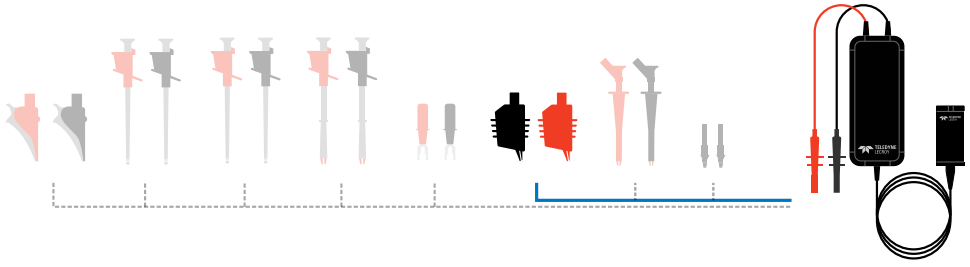
HVD3206A / 3206A-6M



HVD3220



HVD3605A



HIGH VOLTAGE DIFFERENTIAL PROBES

Teledyne LeCroy High Voltage Differential Probe Model Numbers:

HVD3102A
HVD3106A
HVD3106A-6M
HVD3206A
HVD3206A-6M
HVD3220
HVD3605A
AP031

Ordering Information

Product Description	Product Code
1 kV, 25 MHz High Voltage Differential Probe with 2 m cable	HVD3102A
1 kV, 120 MHz High Voltage Differential Probe with 2 m cable	HVD3106A
1 kV, 80 MHz High Voltage Differential Probe with 6 m cable	HVD3106A-6M
1 kV, 25 MHz High Voltage Differential Probe with 2 m cable without tip Accessories	HVD3102A-NOACC
1 kV, 120 MHz High Voltage Differential Probe with 2 m cable without tip Accessories	HVD3106A-NOACC
2 kV, 120 MHz High Voltage Differential Probe with 2 m cable	HVD3206A
2 kV, 80 MHz High Voltage Differential Probe with 6 m cable	HVD3206A-6M
2 kV, 400 MHz High Voltage Differential Probe with 2 m cable	HVD3220
6 kV, 100 MHz High Voltage Differential Probe with 6 m cable	HVD3605A
High Voltage Replacement Accessories Kit (Includes 2 each): High Bandwidth 4 mm Probe Tip Adapters, Safety Alligator Clips, Plunger Pincer Clips, Plunger Hook Clips, Plunger Alligator Clips, Spade Terminals	PK-HV-001

AP031

The AP031 is a low cost, battery operated active differential probe intended for measuring higher voltages. The differential techniques employed permit measurements to be taken at two points in a circuit without reference to the ground, allowing the oscilloscope to be safely grounded without the use of opto-isolators or isolating transformers.

Key Features

- Safe floating measurements
- 15 MHz bandwidth
- 700 V maximum input voltage
- Works with any 1 MΩ input oscilloscope

Specifications

Attenuation	÷10 / ÷100
Bandwidth	15 MHz
Input R	4 MΩ
Differential Mode Range	±70 V / ±700 V DC + Peak AC
Common Mode Range	±700 V DC + Peak AC
CMRR	86 dB @ 50 Hz 56 dB @ 200 kHz

Power Requirements: four AA batteries

Ordering Information

Product Description	Product Code
700 V, 15 MHz Differential Probe (÷10, ÷100)	AP031

HIGH VOLTAGE PROBES

High voltage probes are suitable for a wide range of applications where high-voltage measurements must be made safely and accurately. There are several fixed attenuation probes covering a range from 1 kV to 6 kV and varying transient overvoltage ratings. All of these high voltage probes feature a spring loaded probe tip and a variety of standard accessories to make probing high voltages safe and easy. Additionally, all of the high voltage probe have a probe sense pin to automatically configure the oscilloscope for use with the probe.

Teledyne LeCroy
High Voltage Probe
Model Numbers:

HVP120
PPE4KV
PPE5KV
PPE6KV

Opposite page:
PPE Series High Voltage Probe with a WaveSurfer 4000HD High Definition Oscilloscope.

Teledyne LeCroy
High Voltage Probe
Model Number:

HVP120

The HVP120 is a high voltage passive probe designed for probing up to 1,000 Vrms and capable of handling up to 6,000 V peak transients. Its fast rise time and excellent frequency response make it suitable for a wide variety of high voltage measurement applications. The HVP120 features a spring loaded probe tip and a variety of standard accessories to make probing high voltages safe and easy.

Electrical Characteristics

Bandwidth	400 MHz
Risetime (10% - 90%)	900 ps (typical)
Maximum Input Voltage*	
Measurement Category II	1000 Vrms
Measurement Category I	4000V Transient Overvoltage at 1000 Vrms 6000V Transient Overvoltage at 0 Vrms
Pollution Degree*	2
Input Capacitance	7.5 pF (typical)
Compensation Range	10 pF - 50 pF (typical)
Attenuation Ratio	100:1 ± 2%

Environmental

Temperature (Operating)	0°C to 50°C
Temperature (Non-Operating)	-40°C to 71°C
Humidity (Operating)	80% RH (Non-Condensing) up to 31°C, decreasing linearly to 40% RH at 50°C
Altitude (Operating)	up to 2,000 m
Altitude (Non-Operating)	up to 15,000 m

General Characteristics

Weight (probe)	67 g (0.15 lbs)
Cable Length	2 m (6.56 ft)
Probe Tip Diameter	5 mm (0.20 inches)

** As defined in IEC 61010-031*

Ordering Information

Product Description	Product Code
400 MHz, High Voltage Passive Probe	HVP120
High Voltage Replacement Accessories Kit	PK-HV-002

Replacement Accessories

One of each of the following accessories are included with the HVP120. Replacement quantities are listed below.

Coding Rings (set) 4 Colors (Qty 3 also included standard)	PK1-5MM-106
Ground Lead 22 cm to 4 mm Banana plug (Qty 1)	PK1-5MM-122
Solid Tip 0.8 mm (Qty 5)	PK1-5MM-125
Spring Tip 0.8 mm (Qty 5)	PK1-5MM-126
BNC Adapter 5.0-L (Qty 1)	PK1-5MM-127
Insulating Cap 5.0-L (Qty 1)	PK1-5MM-128
Protection Cap 5.0-L (Qty 1)	PK1-5MM-129
Sprung Hook 5.0-L (Qty 1)	PK1-5MM-130
Adjustment Tool T (Qty 1)	PK1-5MM-131
Flexible Adapter 5.0-L (Qty 1)	PK1-5MM-132
Safety Alligator Clip red (Qty 1)	PK1-5MM-133
Ground Lead 22 cm (Qty 1)	PK1-5MM-134

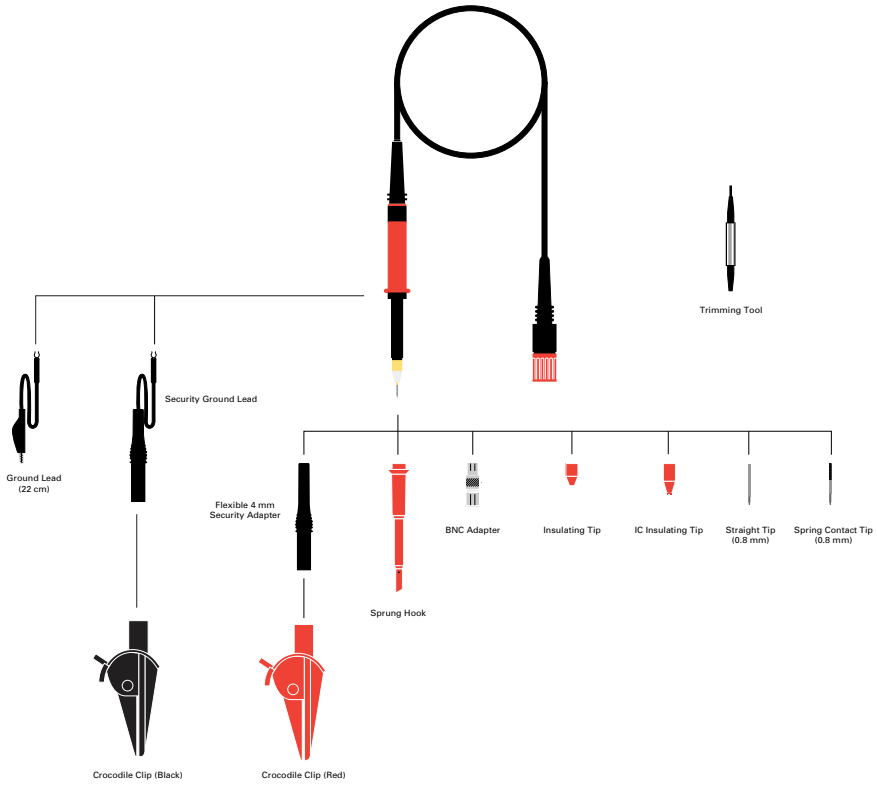
The PPE series includes four fixed-attenuation probes covering a range from 2 kV to 6 kV, and one switchable probe providing ÷10/÷100 attenuation for voltage inputs up to 1.2 kV. All fixed-attenuation, standard probes automatically rescale compatible Teledyne LeCroy oscilloscopes for the appropriate attenuation of the probe.

Teledyne LeCroy High Voltage Probe Model Numbers:

PPE4KV
PPE5KV
PPE6KV

PPE High-Voltage Probes Selection Guide Specifications

Types	Bandwidth (MHz)	Input R (Ω)	Input C (pF)	Attenuation	Maximum Voltage	Probe Encoding	Cable
PPE4kV*	400	50 M	< 6	÷100	4 kV	Yes	2 m
PPE5kV*	400	50 M	< 6	÷100	5 kV	Yes	2 m
PPE6kV*	400	50 M	< 6	÷1000	6 kV	Yes	2 m

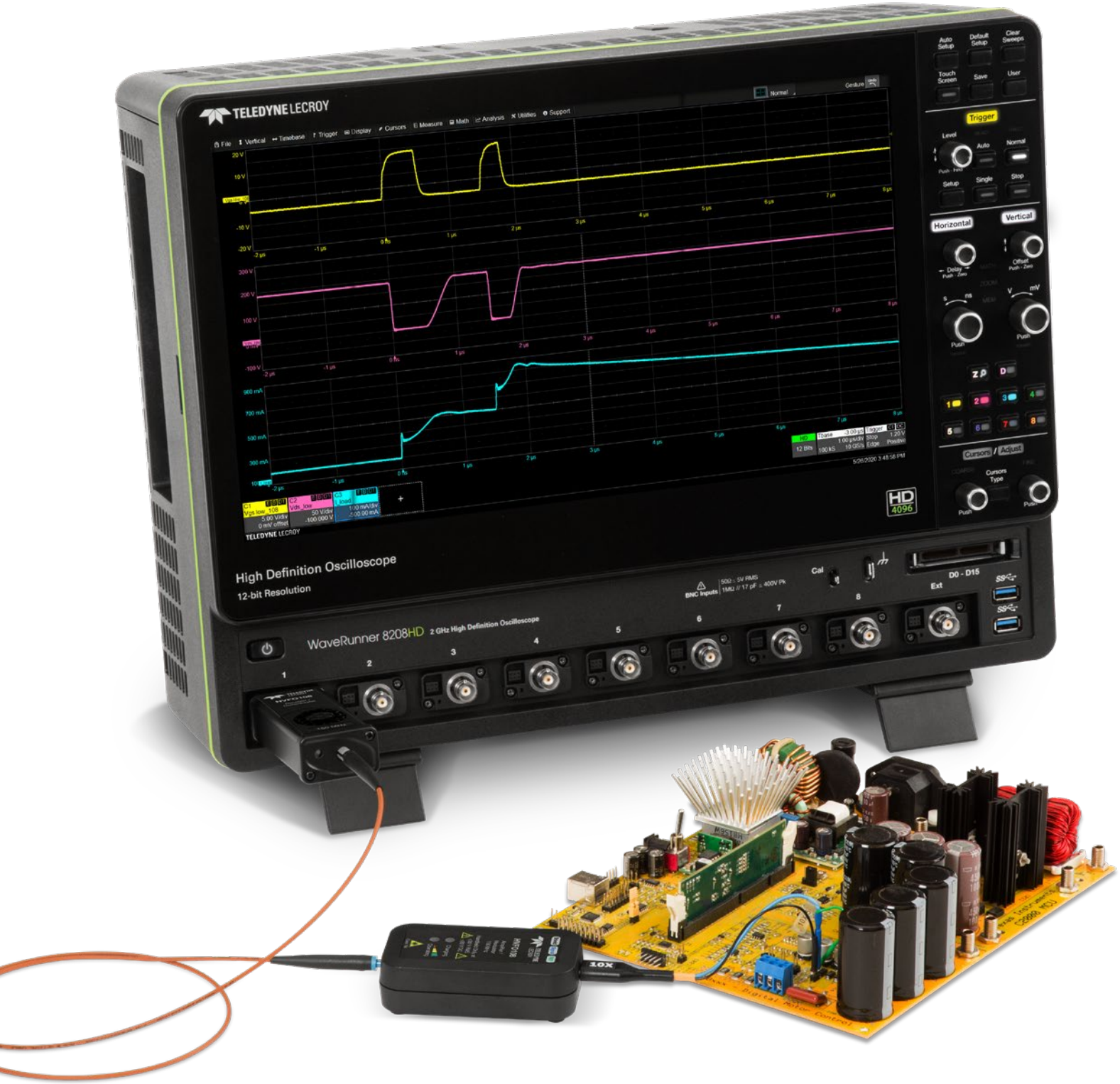


Ordering Information

Product Description	Product Code
÷100; 400 MHz; 50 MΩ High-Voltage Probe, 4 kV max. Voltage DC and Peak AC	PPE4KV
÷100; 400 MHz; 50 MΩ High-Voltage Probe, 5 kV max. Voltage DC and Peak AC	PPE5KV
÷1000; 400 MHz; 50 MΩ High-Voltage Probe, 6 kV max. Voltage DC and Peak AC	PPE6KV
Accessory Kit for PPE1.2kV, 2kV, 4kV, 5kV, and 6kV	PK103
Sprung Hook (red)	PK103-1
Ground Lead (22 cm)	PP005-GL22
Crocodile Clip	PK30x-2
Probe Tip to BNC Adapter	PP005-BNC
Spring Tip (0.8 mm)	PP005-ST8
Rigid Tip V2A	PP005-RT

Supplied with probe:
* Probe Kit: Trimming tool, ground lead, rigid tip, IC insulator, BNC adapter, tip insulator, spring hook, red crocodile clip. 4 mm safety ground lead, and green/yellow crocodile clip.

HIGH VOLTAGE FIBER OPTICALLY-ISOLATED PROBES



HIGH VOLTAGE FIBER OPTICALLY-ISOLATED PROBES

The HVFO is an affordable, optimally designed probe for measurement of small signals floating on an HV bus in power electronics designs or for EMC, EFT, ESD, and RF immunity testing sensor monitoring. It far surpasses the measurement capabilities and signal fidelity of both conventional HV differential probes and acquisition systems that rely on galvanic high voltage isolation. Furthermore, it mitigates the need to rely on dangerous test setups that require floating the oscilloscope and probe.

Teledyne LeCroy Probe Adapter Model Numbers:

HVFO108

Opposite page:
High Voltage Fiber Optically-isolated Probe with a WaveRunner 8000HD High Definition Oscilloscope.

HIGH VOLTAGE FIBER OPTICALLY-ISOLATED PROBES

Teledyne LeCroy
High Voltage Fiber
Optically-isolated Probe
Model Number:

HVFO108

The HVFO is an affordable, optimally designed probe for measurement of small signals floating on an HV bus in power electronics designs or for EMC, EFT, ESD, and RF immunity testing sensor monitoring. It far surpasses the measurement capabilities and signal fidelity of both conventional HV differential probes and acquisition systems that rely on galvanic high voltage isolation. Furthermore, it mitigates the need to rely on dangerous test setups that require floating the oscilloscope and probe.

Key Features

150 MHz bandwidth

35 kV common-mode voltage rating (fiber optic isolation)

Superior Noise and Rejection

- **140 dB CMRR**
- **Low loop inductance**
- **Low attenuation**

Optical isolation reduces adverse loading of DUT

Selectable tips from ±1V to ±40V

Applications

- **Upper-side gate drive signal measurements**
- **Floating control signal or sensor voltage measurements**
- **EMC, EFT, ESD, and RF immunity testing and system optimization**
- **Any small signal measurements with high common-mode voltage**

Electrical

Bandwidth	150 MHz (typical, with tip attached)
Rise Time (10-90%)	3.3 ns (typical)
Input Dynamic Range	±1V, ±5V, ±10V, ±20V, ±40V (DC+peak AC) respectively with 1X, 5X, 10X, 20X or 40X attenuating tips. All tips are purchased as accessories (none are included with HVFO108 probe).
Maximum Non-destruct Voltage	5 times the operating voltage rating (tip dependent)
Common Mode Voltage Range	±35 kV (DC+Peak AC) (not for hand-held use, with adequate spacing between probe components and earth ground)
Maximum Input Voltage to Earth	±35 kV (DC+Peak AC) (not for hand-held use, with adequate spacing between probe components and earth ground)
Maximum Safe Input Voltage	For hand-held use, 30 Vrms / 60 Vdc per IEC/EN 61010-031:2015
Offset	Offset capability determined by oscilloscope offset available in a given gain (V/div) setting after accounting for total probe attenuation (total probe attenuation is twice the tip attenuation).
Sensitivity	10 mV/div to 1 V/div (1X tip), 50 mV/div to 5 V/div (5X tip), 100 mV/div to 10 V/div (10X tip), 200 mV/div to 20 V/div (20X tip), 400 mV/div to 40 V/div (40X tip)
Gain Accuracy	2.5% (typical), 4% (guaranteed)
Input Impedance	1 MΩ || 34 pF (1X tip); 5 MΩ || 26 pF (5X tip); 8 MΩ || 23 pF (10X tip); 10 MΩ || 22 pF (20X tip); 10 MΩ || 22 pF (40X tip)
Input/Output Coupling	DC only
Interface	ProBus
Cable Length	1.25 m (4.1 feet) from input lead to oscilloscope connection (using included 1 meter fiber optic cable)
Battery	6 hour battery life (typical). 2.5 hour re-charge time (typical, with user-supplied dedicated USB charger). 5 hour re-charge time (typical) using supplied USB charging cable connected to oscilloscope USB port

Noise, Rejection, and Electromagnetic Compatibility (EMC)

CMRR (typical)	140 dB (100 Hz), 120 dB (to 1 MHz), 85 dB (to 10 MHz), 60 dB (to 60 MHz), 35 dB (to 150 MHz)
Noise (Probe only)	7 mVrms (1X tip), 35 mVrms (5X tip), 70 mVrms (10X tip), 140 mVrms (20X tip), 280 mVrms (40X tip)
Noise Density (Probe only)	570 nV/√Hz
Electrostatic Discharge (ESD) Immunity	8 kV contact discharge and 10 kV air discharge per IEC61000-4-2, criteria A
Radiated RF Electromagnetic Field Immunity	25 V/m (80 MHz to 2.7 GHz) per IEC61000-4-3, criteria A
Immunity to Conducted Disturbance Induced by RF Fields	10 V/m (150 kHz to 80 MHz) per IEC61000-4-6, criteria A

Environmental

Temperature	10°C to 40°C (operating), -20°C to 70°C (non-operating)
Humidity	5% to 80% RH (non-condensing) up to 30°C, decreasing linearly to 45% RH at 50°C (operating) 5% to 95% RH (non-condensing), 80% RH above 30°C, 45% RH above 50°C (non-operating)
Altitude	Up to 3000 m (operating), 10,000 m (non-operating)
Pollution Degree	2, Indoor Use Only

Certifications

CE Declaration of Conformity	Low Voltage Directive 2014/35/EU (IEC/EN 61010-031:2015) EMC Directive 2014/30/EU (IEC/EN 61326-1:2013) RoHS2 Directive 2011/65/EU

Ordering Information

Product Description	Product Code
High Voltage Fiber Optically-isolated Probe Models and Accessories	
High Voltage Fiber Optic Probe, 150 MHz Bandwidth. Includes soft-carrying case, Qty. 1 Amplifier/Modulating Transmitter, Qty. 1 Demodulating Receiver, Qty. 1 1m Fiber Optic Cable, Qty. 1 USB Charging Cable, Qty. 1 Micro-gripper set.	HVFO108
Attenuating Tips must be ordered separately.	
HVFO10X +/-1V (1x Attenuation) Universal Tip Accessory	HVFO100-1X-TIP-U
HVFO10X +/-5V (5x Attenuation) Universal Tip Accessory	HVFO100-5X-TIP-U
HVFO10X +/-10V (10x Attenuation) Universal Tip Accessory	HVFO100-10X-TIP-U
HVFO10X +/-20V (20x Attenuation) Universal Tip Accessory	HVFO100-20X-TIP-U
HVFO10X +/-40V (40x Attenuation) Universal Tip Accessory	HVFO100-40X-TIP-U
1m Spare Fiber Optic Cable Accessory	HVFO-1M-FIBER
6m Fiber Optic Cable Accessory	HVFO-6M-FIBER
NIST Traceable Calibration Certificate	HVFO108-CCNIST

OPTICAL-TO-ELECTRICAL CONVERTERS

Teledyne LeCroy's wide-band multi-mode optical-to-electrical converters are designed for measuring optical communications signals. Their broad wavelength range and multi-mode input optics make these devices ideal for applications including Ethernet, Fibre Channel, and ITU telecom standards. Available to support optical data rates up to 11.3 Gb/s with reference receivers, or slightly higher without reference receivers.

These wide- band multi-mode optical-to-electrical converters are designed for measuring optical communications signals. They connect to Teledyne LeCroy real-time oscilloscopes and provide capability for physical layer signal assessment using a variety of oscilloscope tools, such as SDAIII-CompleteLinQ Serial Data Eye, Jitter, Noise and Crosstalk Analysis, mask testing, serial triggering and decoding, and other compliance and debug tools. Maximum data rate test capability is >11.317 Gb/s with reference receiver, or 12.5 Gb/s without.

Teledyne LeCroy Optical Probe Model Numbers:

OE6250G-M
OE695G
OE425
OE455
OE525
OE555

Opposite page:
OE6250G-M Optical Probe with a LabMaster 10 Zi-A oscilloscope.

OPTICAL-TO-ELECTRICAL CONVERTERS

Teledyne LeCroy
Optical Probe
Model Numbers:

OE6250G-M
OE695G
OE425
OE455
OE525
OE555

OE6250G-M

The OE6250G optical-to-electrical converter enables optical signal measurement of intensity-modulated signals up to 28 Gbaud and beyond on LabMaster or WaveMaster series real-time oscilloscopes. As a fully calibrated module, the OE6250G-M integrates seamlessly into the oscilloscope software to give optical intensity measurement straight out of the box. Teledyne LeCroy's extensive toolset includes powerful analysis tools for NRZ, PAM4, and other signal types, and enables custom signal processing and reference receiver implementation.

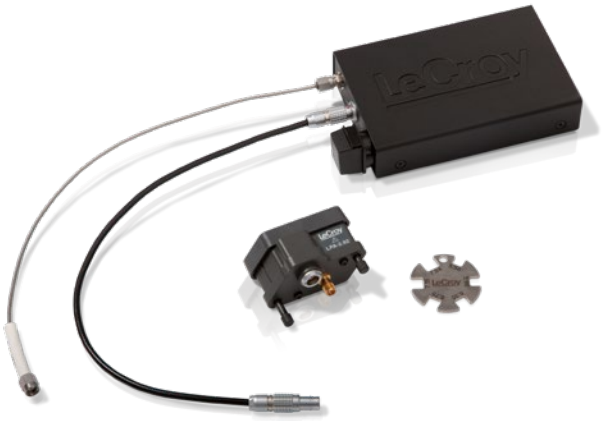
Key Features

- Optical-to-electrical converter for intensity-modulated signals to 28 Gbaud and higher
  – Up to 25 GHz bandwidth with a 4th-order Bessel-Thomson frequency response
  – Up to 36 GHz bandwidth with a flat frequency response
- DC-coupled detector for accurate signal reproduction with a real-time oscilloscope
- Fully calibrated and integrated
- 50/125 µm multi-mode fiber input
- Ideal for Eye Mask, Extinction Ratio, and Optical Modulation Amplitude (OMA) testing

OE6250G-M Specifications

	Typical
Analog Bandwidth	25 GHz (Bessel-Thomson response mode), 36 GHz (Flatness response mode)
Wavelength Range	830nm - 1600nm
Calibration Wavelengths	850nm, 1310nm, 1550nm
Conversion gain at 850nm	-80 V/W
Conversion gain at 1310nm	-125 V/W
Conversion gain at 1550nm	-125 V/W
Electrical output coupling	DC coupled
5% compression point at 1550nm	4 mW (minimum)
Noise measured up to 50GHz	500 uV RMS
Optical Return Loss	19 dB
Polarization dependent loss at 1550 nm	0.1 dB
RF impedance	50 Ω
Fiber (core/cladding)	50/125 µm
RF connector	2.92 mm
Optical Connector	FC/PC or SC/PC

Note: All specifications subject to change without notice.



OE695G

The OE695G wide-band optical-to-electrical converter is ideal for measuring optical datacom and telecom signals with data rates from 622 Mb/s to 12.5+ Gb/s. Connection to a real-time Teledyne LeCroy oscilloscope is through the 2.92 mm interface, with a provided adapter to connect to ProLink interfaces.

Key Features

- Compatible with LabMaster 10 Zi oscilloscopes
- Frequency range DC to 9.5 GHz (electrical, -3 dB)
- Reference receiver support from 8GFC to 10GFC FEC, or Custom (<12.5Gb/s)
- Full bandwidth mode (no reference receiver applied)
- 62.5/125 µm multi-mode or single-mode fiber input
- Broad wavelength range (750 to 1650 nm)
- +7 dBm (5 mW) max peak optical power
- Low noise (as low as 25 pW/√Hz)
- Ideal for Eye Mask, Extinction Ratio, and Optical Modulation Amplitude (OMA) testing

OE425/OE455/OE525/OE555

The O/E converters contain calibration data that can be used to create optical reference receivers for SONET/SDH (up to OC48/STM16), Fibre Channel, Gigabit Ethernet, and other optical standards. This feature is available when the O/E is used on a supported oscilloscope. The universal reference receiver supports any data rate up to 3 GHz and remains calibrated on any channel of the oscilloscope.

Key Features

- Frequency range to 5 GHz (6 GHz optical)
- 62.5 µm or narrower multi-mode or single-mode fiber input
- Broad wavelength range:
  – 500–870 nm (OE425, OE525)
  – 950–1630 nm (OE455, OE555)
- High responsivity
- Low noise
- Included Accessories:
  Multi-mode optical fiber jumper FC-FC
  FC to ST adapter
  FC to SC adapter

Ordering Information

Product Description	Product Code
Optical-to-Electrical Converter, DC to 36 GHz, 830 to 1600nm	OE6250G-M
Optical-to-Electrical Converter, 785 to 1550 nm, 2.92 mm connector with ProLink adapter	OE695G
Optical-to-Electrical Converter, 500–870 nm ProBus BNC Connector ** Limited Availability*	OE425
Optical-to-Electrical Converter, 950–1630 nm ProBus BNC Connector ** Limited Availability*	OE455
Optical-to-Electrical Converter, 500–870 nm ProLink BMA Connector ** Limited Availability*	OE525
Optical-to-Electrical Converter, 950–1630 nm ProLink BMA Connector	OE555


0.9V
DC1M
140 mV/div
-446 mV ofst
TELEDYNE LECROY
HD
12 Bits
WaveSurfer HD
High Definition Oscilloscope
WaveSurfer 4104HD
1 GHz High Definition Oscilloscope
5 GS/s
1
2
3
4

Passive probes are the standard probe provided with most oscilloscopes. Typical passive probes provide a ÷10 attenuation and feature a high input resistance of 10 MΩ. This high input resistance means that passive probes are the ideal tool for low frequency signals since circuit loading at these frequencies is minimized. Passive probes are designed to handle voltages of at least 400 V, some as high as 600 V. Teledyne LeCroy passive probes feature an attenuation sense pin which tells the oscilloscope to scale the waveforms automatically requiring no user input.

Teledyne LeCroy Passive Probe Model Numbers:

PP016
PP018
PP019
PP020
PP021
PP022
PP023
PP024
PP025
PP026

PASSIVE PROBES

Teledyne LeCroy Passive Probe Model Numbers:

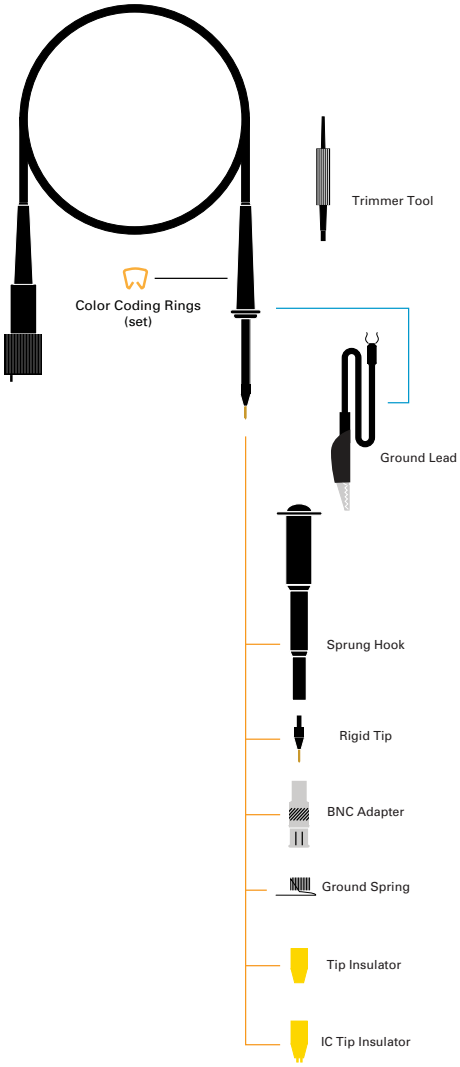
PP016
PP018
PP019
PP020
PP021
PP022
PP023
PP024
PP026

Each passive probe is recommended for a certain oscilloscope, using the right passive probe with the right oscilloscope means that the probe can be properly compensated across the entire bandwidth. Using probes with a different oscilloscope will only let you compensate for low frequencies.

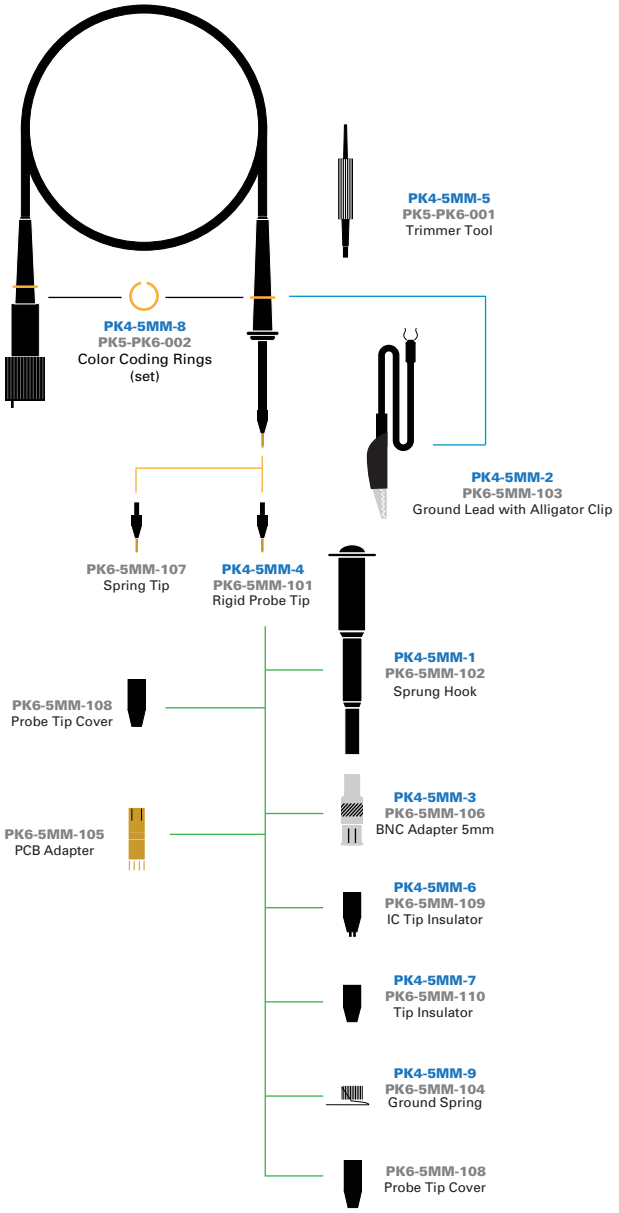
Specifications

Types	Bandwidth	Input R	Input C	Attenuation	Maximum Voltage	Diameter
PP016	300 MHz/ 10 MHz	10 MΩ/ 1 MΩ	12 pF/ 46 pF	÷10/ ÷1	600 V	5 mm
PP018	500 MHz	10 MΩ	10 pF	÷10	350 V	5 mm
PP019	200 MHz	10 MΩ	12 pF	÷10	500 V	5 mm
PP020	500 MHz	10 MΩ	11 pF	÷10	500 V	5 mm
PP021	500 MHz	10 MΩ	11 pF	÷10	500 V	2.5 mm
PP022	500 MHz	10 MΩ	10 pF	÷10	500 V	2.5 mm
PP023	500 MHz	10 MΩ	10 pF	÷10	500 V	2.5 mm
PP024	500 MHz	10 MΩ	10 pF	÷10	500 V	5 mm
PP025	500 MHz	10 MΩ	10 pF	÷10	500 V	5 mm
PP026	500 MHz	10 MΩ	10 pF	÷10	500 V	5 mm

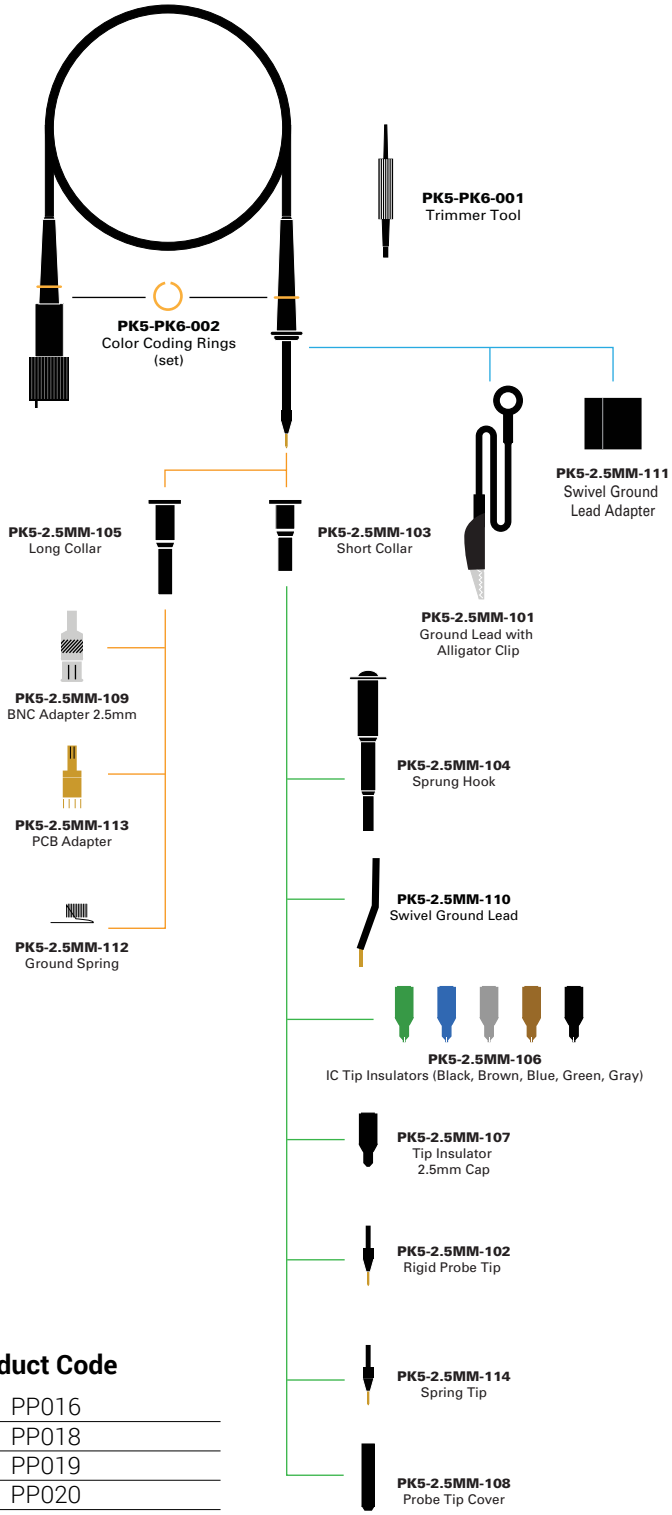
Passive Probe Accessories for PP016
Replacement Part Kit: PKIT3-5MM-101



Passive Probe Accessories for
PP019 and PP020 – *Part numbers in blue*
Replacement Part Kit: PKIT4-5MM-101
PP024, PP025, and PP026 – *Part numbers in gray*
Replacement Part Kit: PKIT6-5MM-101



Passive Probe Accessories for
PP021, PP022, and PP023
Replacement Part Kit: PKIT5-2.5MM-101



Ordering Information

Product Description	Product Code
10:1, 10 MΩ, 300 MHz Passive Probe	PP016
500 MHz Passive Probe, 10:1, 10 MΩ	PP018
250 MHz Passive Probe, 10:1, 10 MΩ	PP019
500 MHz Passive Probe, 10:1, 10 MΩ	PP020
500 MHz Passive Probe, 2.5mm, 10:1, 10 MΩ	PP021
500 MHz Passive Probe, 2.5mm, 10:1, 10 MΩ	PP022
500 MHz Passive Probe, 2.5mm, 10:1, 10 MΩ	PP023
500 MHz Passive Probe, 5mm, 10:1, 10 MΩ	PP024
500 MHz Passive Probe, 5mm, 10:1, 10 MΩ	PP025
500 MHz Passive Probe, 5mm, 10:1, 10 MΩ	PP026

Teledyne LeCroy Probe Adapter Model Numbers:

CA10
TPA10

Probe adapters provide simple and easy interface of third-party probes as well as change between the different Teledyne LeCroy Oscilloscope input and cable types (ProBus, ProLink, K/2.92 mm, BNC and SMA). Depending on the adapters, changing between the Teledyne LeCroy Oscilloscope's input type may have an effect on the overall performance of the channel.

Key Features

- Provides ability for third party current sensor to operate like a Teledyne LeCroy probe
- Programmable EEPROM for saving third party current sensor parameters
- Allows for addition of shunt resistor and RLC filter components
- ProBus Active interface with automatic scaling in A/div
- Easy to use, saves time and possible errors

CA10

The CA10 is a programmable and customizable interface device that seamlessly incorporates third party current transducers/transformers with Teledyne LeCroy oscilloscopes or motor drive analyzers. The easy to use interface provides the ability for the CA10 to be programmed to contain the specifications of the current sensor allowing it to automatically correct for the gain or attenuation and display results in Ampere units. This allows the third party device to be recognized and operate as if it were a Teledyne LeCroy probe.

Specifications

Input Coupling	DC, AC, Both
Input Termination	1MΩ or 50Ω
Programmable Bandwidth Filters	Full, 200 MHz, 20 MHz
Transformer/Transducer Interface	BNC
Scaling Factors	Programmable
Resistive Termination (if required)	Customizable (See Operator's Manual for details)
Oscilloscope Interface	Teledyne LeCroy ProBus

Note: Some third party devices will require a separate power supply or batteries. The CA10 does not have the ability to supply the power to these devices.

Ordering Information

Product Description	Product Code
ProBus Current Sensor Adapter	CA10

Included with Standard Configuration CA10

Description	Qty
CA10 ProBus Current Adapter	1
Heat-Shrink tubing (6" length)	1
Removable Labels (sheet of 20)	1

Key Features

- Allows TekProbe™ interface level II probes to work with any ProBus-equipped Teledyne LeCroy oscilloscope
- Automatic probe detection
- Provides all necessary power and offset control to the attached probe
- Supports probes up to 4 GHz
- Easy firmware updates
- Wide variety of probes supported including:
  - Preamplifiers
  - Current Probes
  - Single-Ended Active Probes
  - Differential Active Probes

TPA10

The TPA10 ProBus™ Probe Adapter enables you to connect select TekProbe interface level II probes to any ProBus-equipped Teledyne LeCroy instrument. The TPA10 supplies all necessary power and offset control to the probe and automatically detects which probe is attached.

Specifications

Electrical Characteristics

Bandwidth	4 GHz (adapter only)
Power Supplies	+15V, -15V, +5V, -5V (each 2%)
Offset Voltage	±1V (1%)
Max. Input Voltage	47 V_{pk}, 33 V_{rms}

Environmental

Operating Temperature Range	0 to 50 °C
Non-operating Temperature Range	-40 to +70 °C
Humidity	5% to 95% RH (10 to 40 °C); 5% to 75% (above 40 °C); RH not controlled below 10 °C
Operating Altitude	3000 meters maximum

Physical

Dimensions (WxHxD)	39 mm x 31.1 mm x 88.6 mm (1.54" x 1.22" x 3.49")
Weight	119 g (0.26 lb)

The TPA10 requires the Teledyne LeCroy oscilloscope to be running firmware version 7.8.0.0 or greater.

Ordering Information

Product Description	Product Code
TPA10 ProBus Adapter	TPA10

Supported Probes

The following TekProbe devices are supported for use with TPA10:

Preamplifiers

1 MHz Differential Preamplifier	ADA400A

Current Probes

50 MHz AC/DC Current Probe	TCP202/TCP202A

Single-ended Active Probes

750 MHz Single-ended Active Probe	P6205
1 GHz Single-ended Active Probe	P6243
1.5 GHz Single-ended Active Probe	P6245
4 GHz Single-ended Active Probe	P6241
4 GHz Single-ended Active Probe	P6249

Differential Active Probes

100 MHz Differential Probe	P5205/P5205A
50 MHz Differential Probe	P5210/P5210A
400 MHz Differential Probe	P6246
1 GHz Differential Probe	P6247
1.5 GHz Differential Probe	P6248
500 MHz Differential Probe	P6250
1 GHz Differential Probe	P6251

TRANSMISSION LINE PROBES

Teledyne LeCroy
Transmission Line Probe
Model Number:

PP066

Transmission line probes are a special type of passive probe designed for use at very high frequencies. They replace the high impedance probe cable found in a traditional passive probe with a precision transmission line, with a characteristic impedance that matches the oscilloscope input (50 Ω). This greatly reduces the input capacitance to a fraction of a picofarad, minimizing the loading of high frequency signals. A matching network at the tip increases the DC input resistance. While they have lower DC input resistance than a traditional passive probe (usually 500 Ω to 5 kΩ), the input impedance of these probes remains nearly constant over their entire frequency range. A traditional ÷10 passive probe will have a 10 MΩ input impedance at DC, however this impedance drops rapidly with frequency, passing below the input impedance of a transmission line probe at less than 100 MHz.

In some applications, transmission line probes offer advantages over active probes. In addition to being less expensive, their passive design is more robust to over voltage and ESD exposure. They are useful in applications producing fast rising, narrow pulses with amplitudes which exceed the dynamic range of active probes. They also tend to have less parasitic effects on frequency response.

PP066

The PP066 is a high-bandwidth passive probe designed for use with the WaveMaster and other high-bandwidth oscilloscopes with 50 Ω input termination. This very low capacitance probe provides an excellent solution for higher frequency applications, especially the probing of transmission lines with 20–100 Ω impedance. The PP066 accommodates a wide range of applications, including probing of analog and digital ICs commonly found in computer, communications, data storage, and other high-speed designs.

Key Features:

- Interchangeable attenuator tips
- Signal integrity at high bandwidth
- Standard SMA cable connection
- Ultra low capacitance

PP066 Specifications

Electrical Characteristics	
Bandwidth	DC to 7.5 GHz
Risetime	< 47 ps
Input Capacitance	< 0.20 pF
Input Resistance	500 Ω (÷10 cartridge) 1000 Ω (÷20 cartridge)
Maximum Voltage	15 V rms
Cable Length	1 m

Ordering Information

Product Description	Product Code
7.5 GHz Low Capacitance Passive Probe (÷10, 1 kΩ; ÷20, 500 Ω)	PP066

Included with PP0066

PACC-AD001, SMA to BNC Adapter

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