TELEDYNE LECROY
Everywhereyoulook™

WaveLink® High Bandwidth Differential Probing System
(13 GHz – 25 GHz)

- 25 GHz Solder-In Lead
- Ultra-compact Browser
- Superior Probe Impedance
- Superior Noise Performance

EXCEPTIONAL BANDWIDTH AND SIGNAL FIDELITY

Features & Benefits

- **Up to 25 GHz bandwidth (probe + oscilloscope)**
- **System rise time as fast as 13 ps (20–80%)**
- **Highest bandwidth Solder-In solution (25 GHz)**
- **Ultra-compact browser tip (22 GHz)**
- **Superior probe impedance minimizes AC loading on device under test (DUT)**
- **Carbon-composite browser tips optimize signal fidelity and loading**
- **Probe noise as low as 14 nV/√Hz (1.6 mV_{rms})**
- **Low probe attenuation**
- **Large operating voltage range ±4 V common mode range ±2.5 V offset range 2.0 V_{pk-pk} dynamic range**
- **Long length Solder-In tip with field replaceable resistors**

The WaveLink Dxx05-A 13-25 GHz differential probe series has large operating voltage ranges, very low probe noise, and superior probe impedance.

Ultra-wideband Architecture for Superior Signal Fidelity

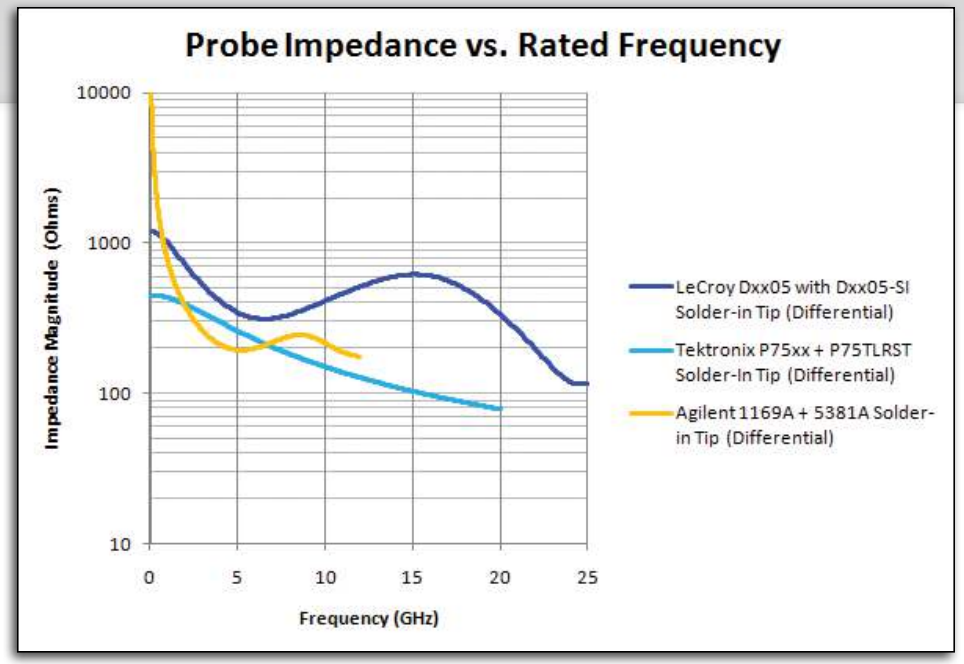
Teledyne LeCroy's WaveLink® high bandwidth differential probes utilize advanced differential traveling wave (distributed) amplifier architecture to achieve superior high frequency true analog broadband performance. Traveling wave (distributed) amplifiers are commonly used in ultra high frequency broadband amplifiers. This multi-stage amplifier architecture maximizes gain per stage and minimizes probe attenuation, which provides very low probe noise and fast rise times.

Highest Bandwidth (25 GHz) Solder-In Lead

Up to 25 GHz Solder-In performance with system (probe + oscilloscope) rise times equal to that of the oscilloscope alone—13 ps (20–80%) and 17.5 ps (10–90%)—and superior impedance and noise performance.

Ultra-compact Positioner (Browser) Tip

The most compact positioner tip browser with bandwidth up to 22 GHz makes probing in confined areas easy. Position multiple probes very close together using a variety of mechanical positioners, or use the hand-held wand for debugging.



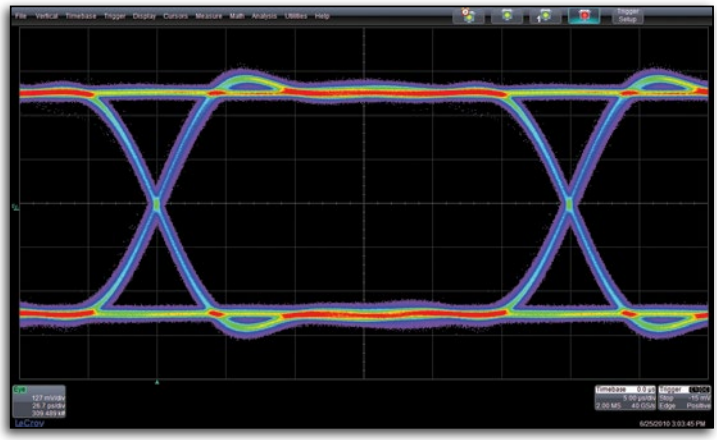
Teledyne LeCroy Solder-In probe impedance is two or three times better than competitive probes, especially at higher frequencies.

Superior Probe Impedance Minimizes Circuit Loading

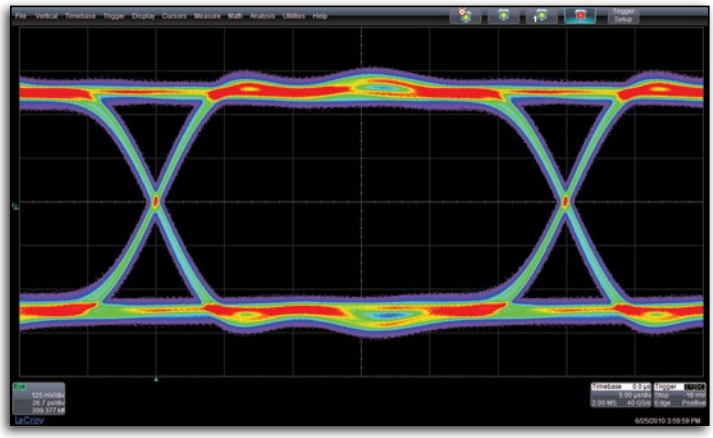
Circuit and signal loading is reduced by more than 50% with WaveLink high bandwidth probes compared to competitive probes. In the mid-band frequency range, the difference is even more apparent. This superior impedance greatly reduces measurement impact and circuit loading. It's made possible with innovative designs that locate probe tip resistance as close to the DUT as possible and, in the case of the browser tip, use advanced materials to optimize performance.

Superior Signal Fidelity and Lowest Noise

WaveLink has exceptional noise performance and the fastest rise times—as fast as 13 ps—to enable measurements of the highest precision on the fastest signals. In fact, the combination of the probe and the oscilloscope results in measurement performance that is nearly identical to that of a cable input. In addition, the probe allows measurements on signals with large differential swings and high offsets while avoiding the use of multiple attenuators that can reduce signal fidelity. The tip construction avoids multiple connection points that could compromise signal fidelity. Serial data signal margins are better characterized and understood with WaveLink.



A 6.25 Gb/s PRBS-7 signal first measured with cable inputs to the oscilloscope (math subtracted waveform, cables de-embedded).



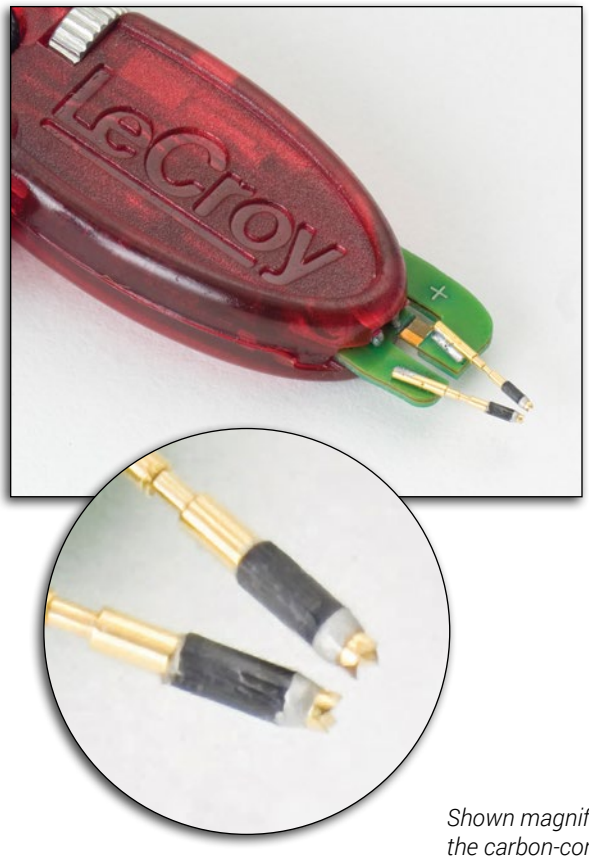
A Teledyne LeCroy D1605-A with Dxx05-PT tip (test fixture de-embedded). Note the high degree of correlation between the two measurements.

ULTRA-COMPACT POSITIONER TIP

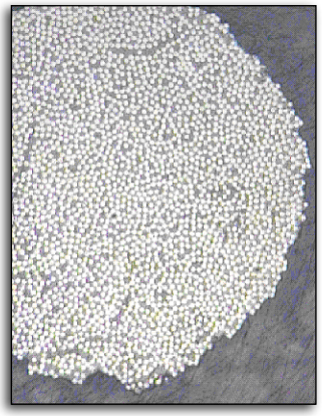
Optimized Performance Using Advanced Materials

Carbon fiber composite pogo-pin resistive tips used in the positioner tip locate an ideal distributed resistance at the point of contact. This design is unique to Teledyne LeCroy and provides several important advantages:

1. It improves signal fidelity by eliminating the skin effect present at high frequencies with purely conductive tips.
2. It eliminates the parasitic loading due to high inductance and capacitance of metal pogo-pins by putting the probe resistance at the point of contact.
3. The composite structure provides mechanical strength for good contact and long life.



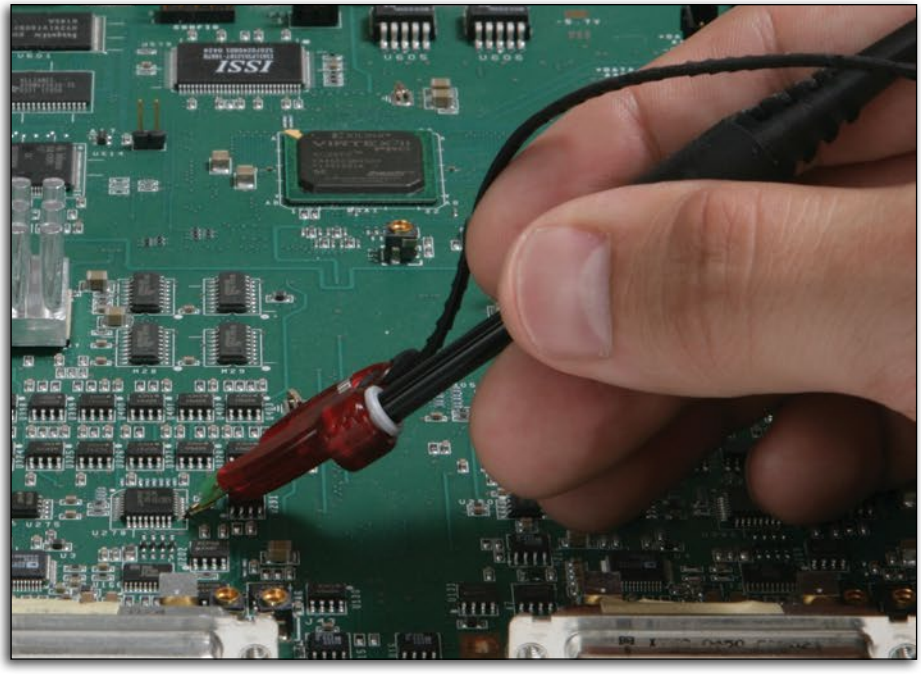
Teledyne LeCroy's browser (positioner tip) consists of an ideal distributed resistance at the point of circuit contact, with a crowned metal tip for positive circuit contact. The assembly is mounted on a metal pogo-pin for z-axis compliance and positive probe contact.



Shown magnified 500x, this cross section of the carbon-composite fiber in the resistive tip shows the fiber structure of the tip that reduces skin effect at high frequencies.

Ultra-compact Size

The positioned tip browser is very small—only 35 mm long, 14 mm wide, and 5 mm thick ($1\frac{3}{8}$" x $\frac{17}{32}$" x $\frac{3}{16}$") and can be easily located in close proximity to other probes or circuit elements. It is easily attached to a wide variety of probe positioners for precise circuit placement. For hand-held browsing, a wand may be attached to facilitate quick acquisition of signals for debug and analysis.



Teledyne LeCroy's Dxx05-PT positioner tip browser can be easily hand-held with the attachable wand or positioned in place with one of many standard or optional accessory mechanical positioners.

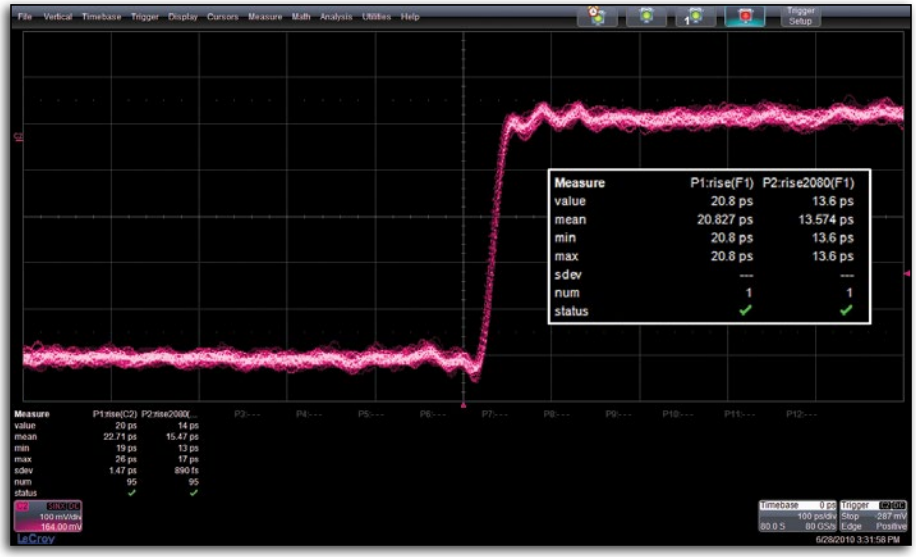
HIGHEST PERFORMING SOLDER-IN LEAD

Superior Bandwidth

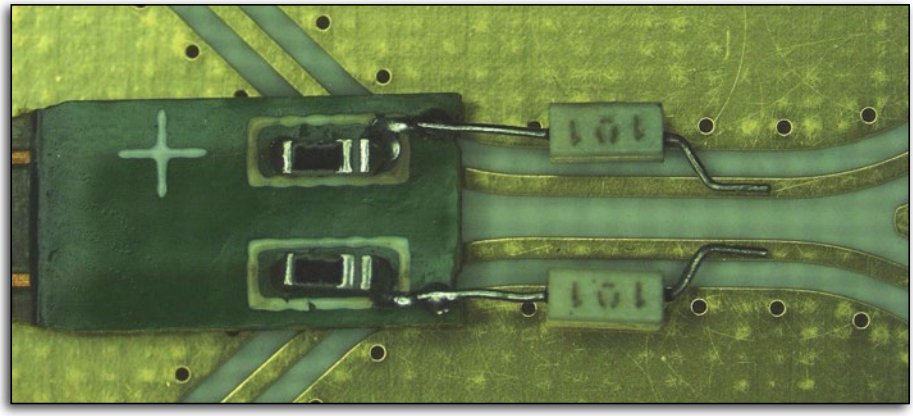
Not only is the probe available with up to 25 GHz of bandwidth, but the rise time of the probe when connected to a Teledyne LeCroy 8 Zi, 9 Zi-A or 10 Zi Series oscilloscope is very fast—system rise times as fast as 13 ps (20–80%). You can use the probe with the assurance that the probe + oscilloscope system rise time will be as fast as a cable input.

Highest Mid-band Probe Impedance Reduces Circuit Loading

Exceptional mid- and high-band probe impedance characteristics make this lead the best performer available. Probe impedance is two to three times larger than competitive probes, resulting in one-half to one-third the circuit loading and better signal fidelity. This performance is made possible by an exceptionally low tip capacitance (75 fF) that tunes the probe impedance to the lead inductance. Additionally, pre-trimmed termination damping resistors are located at the circuit contact point, further improving performance. These resistors are easily field-replaceable.



Teledyne LeCroy D2505-A probe with Dxx05-PT positioner (browser) tip showing rise time response with 20 ps differential input source.



Teledyne LeCroy's Dxx05-SI Solder-In lead has external tip resistors to locate the tip resistance as close to the point of contact as possible. These resistors are installed on the lead at the factory to minimize operator setup time and are field-replaceable, should the need arise.

Optimized Probe + Oscilloscope Performance

All Teledyne LeCroy WaveLink high bandwidth differential probes are automatically calibrated for the highest performance when connected to a Teledyne LeCroy oscilloscope. Teledyne LeCroy has provided this capability since the introduction of the first WaveLink probes in 2003.

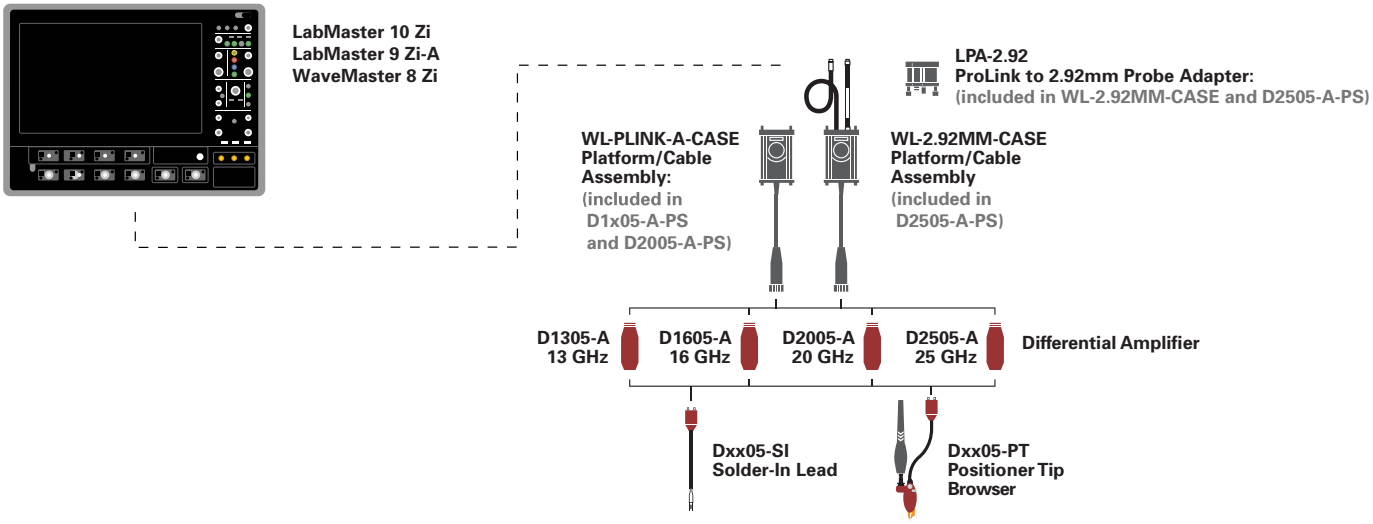
At the factory, each probe undergoes a rigorous calibration and performance verification process that results in a stored response file on-board the probe.

When the probe is connected to a Teledyne LeCroy oscilloscope, the probe and oscilloscope response are optimized to each other to provide a probe + oscilloscope response identical to that of the raw oscilloscope channel.

All that is left for the operator is to de-embed the probe loading from the circuit, if desired, using Teledyne LeCroy's Virtual Probe oscilloscope software option. Since the Teledyne LeCroy probe impedance is very high across the passband, this may not even be necessary.

COMPATIBILITY AND ACCESSORIES

Compatibility Chart



Accessories and Replacement Parts

Standard Accessories	WL-PLINK-A-CASE	WL-2.92MM-CASE	D1x05-A	D1x05-A-PS	D2x05-A	D2x05-A-PS	Dxx05-PT-KIT	Replacement Part
Amplifier System (includes items below with*)			1 each	1 each	1 each	1 each		D1305-A, D1605-A, D2005-A, or D2505-A
*Amplifier			1 each	1 each	1 each	1 each		
*Solder-In Lead Set (includes items below with**)			2 each	2 each	2 each	2 each		Dxx05-SI
**Spare Damping Resistors for SI Tip			10 each	10 each	10 each	10 each		Dxx05-SI-RESISTORS
**Tip Retaining Clip for SI Leads			2 each	2 each	2 each	2 each		PK600ST-3
**Adhesive Tape			1 set	1 set	1 set	1 set		Dxx0-PT-TAPE
*Ground Lead			1 each	1 each	1 each	1 each		PACC-LD005
*Ground Clip			1 each	1 each	1 each	1 each		PK006-4
*Instruction Manual			1 each	1 each	1 each	1 each		WL-HBW-A-OM-E
*Accessory Info Sheet & Quick Start Guide			1 each	1 each	1 each	1 each		921508-00
Positioner Tip with Accessories (kit includes items below with†)				1 each		1 each	1 each	RK-Dxx05-PT-KIT
†Positioner Tip Browser				1 each		1 each	1 each	Dxx05-PT
†Replacement Pogo-pins for Dxx05-PT				1 each		1 each	1 each	Dxx05-PT-TIPS
†Positioner Tip Probe Guides				1 each		1 each	1 each	Dxx05-PT-GUIDES
†XYZ Positioner				1 each		1 each	1 each	Dxx0-PT-XYZ-POSITIONER
†Adhesive Tape for XYZ Positioner				1 set		1 set	1 set	Dxx0-PT-TAPE
†Browser Wand for PT Tip				1 each		1 each	1 each	Dxx0-PT-WAND
†Interlock Pieces for PT Tip				1 each		1 each	1 each	Dxx0-PT-INTERLOCK
†Swivel for PT Tip				1 each		1 each	1 each	Dxx0-PT-SWIVEL
Platform/Cable Assembly Kit (includes items below with‡)	1 each	1 each		1 each		1 each		WL-PLINK-A-CASE for 13, 16, and 20 GHz models WL-2.92MM-CASE for 25 GHz models
‡Platform/Cable Assembly	1 each	1 each		1 each		1 each		
‡Freehand Probe Holder	1 each	1 each		1 each		1 each		PACC-MS001
‡Probe Deskew Fixture	1 each	1 each		1 each		1 each		PCF200
‡Platform/Cable Assembly Mounting Clip	1 each	1 each		1 each		1 each		PK600ST-4 includes 4 adhesive backed clips
‡Probe Cable Clamp	2 each	2 each		2 each		2 each		PK600ST-4 includes 4 adhesive backed clips
‡ESD Wrist Strap	1 each	1 each		1 each		1 each		42402900001
‡Performance Verification Certificate	1 each	1 each		1 each		1 each		
‡Deluxe Soft Carrying Case	1 each	1 each		1 each		1 each		SAC-03
‡Foam Insert for Deluxe Case	1 each	1 each		1 each		1 each		921080-00 (WL-2.92MM-CASE) or 921081-00 (for WL-PLINK-A-CASE)
‡Protective Storage Case	1 each	1 each		1 each		1 each	1 each	921083-00
‡Plastic Tray for Storage Case	1 each	1 each		1 each		1 each	1 each	921078-00
‡ProLink to 2.92 mm Probe Adapter		1 each				1 each (25 GHz Models only)		LPA-2.92
Calibration Certificate								See calibration options

Recommended Accessories	
Deskew Test Fixture	TF-DSQ
Cascade Microtech EZ-Probe Positioner	EZ PROBE

SPECIFICATIONS

	D1305-A, D1305-A-PS	D1605-A, D1605-A-PS	D2005-A, D2005-A-PS	D2505-A, D2505-A-PS
Bandwidth	**Dxx05-SI and Dxx05-PT Tips** 13 GHz (probe only, guaranteed) 13 GHz (system bandwidth, when used with 813Zi, typical)	**Dxx05-SI and Dxx05-PT Tips** 16 GHz (probe only, guaranteed) 16 GHz (system bandwidth, when used with 816Zi, typical)	**Dxx05-SI and Dxx05-PT Tips** 20 GHz (probe only, guaranteed) 20 GHz (system bandwidth, when used with 820Zi, typical)	**Dxx05-SI Lead** 25 GHz (probe only, guaranteed) 25 GHz (system bandwidth, when used with 825Zi, typical) **Dxx05-PT Tip** 22 GHz (system bandwidth, when used with 825Zi, typical) 20 GHz (probe only, guaranteed)
Rise Time (10–90%)	**Dxx05-SI and Dxx05-PT Tips** 32.5 ps (typical) System rise time measured with ≥ 13 GHz oscilloscope)	**Dxx05-SI and Dxx05-PT Tips** 28 ps (typical) System rise time, measured with ≥ 16 GHz oscilloscope	**Dxx05-SI and Dxx05-PT Tips** 20 ps (typical) System rise time measured with ≥ 20 GHz oscilloscope	**Dxx05-SI Lead** 17.5 ps (typical) System rise time measured with ≥ 25 GHz oscilloscope **Dxx05-PT Tip** 19 ps (typical) System rise time measured with ≥ 25 GHz oscilloscope
Rise Time (20–80%)	**Dxx05-SI and Dxx05-PT Tips** 24.5 ps (typical) System rise time measured with ≥ 13 GHz oscilloscope	**Dxx05-SI and Dxx05-PT Tips** 21 ps (typical) System rise time measured with ≥ 16 GHz oscilloscope	**Dxx05-SI and Dxx05-PT Tips** 15 ps (typical) System rise time measured with ≥ 20 GHz oscilloscope	**Dxx05-SI Lead** 13 ps (typical) System rise time measured with ≥ 25 GHz oscilloscope **Dxx05-PT Tip** 14 ps (typical) System rise time measured with ≥ 25 GHz oscilloscope
Noise (Probe)	< 14 nV/√Hz (1.6 mV_{rms}) (typical) Referred to input, 13 GHz bandwidth	< 14 nV/√Hz (1.8 mV_{rms}) (typical) Referred to input, 16 GHz bandwidth	< 18 nV/√Hz (2.5 mV_{rms}) (typical) Referred to input, 20 GHz bandwidth	< 18 nV/√Hz (2.8 mV_{rms}) (typical) Referred to input, 25 GHz bandwidth
Noise (System)	< 23 nV/√Hz (2.7 mV_{rms}) (typical) Referred to input, 13 GHz bandwidth	< 23 nV/√Hz (2.9 mVrms) (typical) Referred to input, 16 GHz bandwidth	< 28 nV/√Hz (4.0 mV_{rms}) (typical) Referred to input, 20 GHz bandwidth	< 28 nV/√Hz (4.5 mV_{rms}) (typical) Referred to input, 25 GHz bandwidth

Input

Input Dynamic Range	2.0 V_{pk-pk}, (±1.0 V) (nominal)			
Input Common Mode Voltage Range	±4 V (nominal)			
Input Offset Voltage Range	±2.5 V Differential (nominal)			
Non-destructive Input Range	±10 V (nominal)			
Attenuation	3.5x (nominal)		4.5x (nominal)	
DC Input Resistance (nominal)	1.1 kΩ Differential 100 kΩ Common mode			
Impedance (Zmin, typical)	**Dxx05-SI Lead** > 300 Ω Differential through entire frequency range **Dxx05-PT Tip** >160 Ω Differential through entire frequency range	**Dxx05-SI Lead** > 300 Ω Differential through entire frequency range **Dxx05-PT Tip** >160 Ω Differential through entire frequency range	**Dxx05-SI Lead** > 230 Ω Differential through entire frequency range **Dxx05-PT Tip** >160 Ω Differential through entire frequency range	**Dxx05-SI Lead** > 120 Ω Differential through entire frequency range **Dxx05-PT Tip** >160 Ω Differential through entire frequency range
Impedance (mid-band, typical)	**Dxx05-SI Lead:** 300 Ω at 6 GHz, 525 Ω at 13 GHz, 600 Ω at 16 GHz, 300 Ω at 20 GHz, 120 Ω at 25 GHz **Dxx05-PT Tip:** 160 Ω at 6 GHz, 450 Ω at 13 GHz, 240 Ω at 16 GHz, 210 Ω at 20 GHz			
CMRR	**Dxx05-SI Lead (typical):** 40 dB DC to 50 MHz; 32 dB to 1 GHz; 20 dB to 16 GHz; 15 dB to 25 GHz **Dxx05-PT Tip (typical):** 36 dB DC to 50 MHz; 30 dB to 1 GHz; 16 dB to 16 GHz; 14 dB to 20 GHz			

Environmental

Temperature	**Operating:** 0 °C to 40 °C; **Non-operating:** -40 °C to 70 °C
Humidity	**Operating:** 5% to 80% RH (non-condensing): 50% RH above 30 °C **Non-operating:** 5% to 95% RH (non-condensing) 75% RH above 30 °C and 45% RH above 40 °C
ESD Tolerance	2 kV (typical) 100 pF, 300 Ω HBM

Dimensions

Dxx05-PT Positioner Tip	0 to 3.5 mm (0 to 0.14") tip spread at circuit connection 0.45 mm tip diameter (0.018") 0.55 mm (0.022") Z-axis compliance
Dxx05-SI Solder-In Lead	0 to 9 mm (0 to 0.35") tip spread at circuit connection
Cable Length	1.3 m (4 ft. 3 in) for both WL-2.92MM-CASE and WL-PLINK-A-CASE, sold separately

ORDERING INFORMATION

Product Description	Product Code
Complete Probe Systems	
13 GHz Complete Probe System with Solder-In Tip (13 GHz) and Positioner Tip Browser (13 GHz)	D1305-A-PS
16 GHz Complete Probe System with Solder-In Tip (16 GHz) and Positioner Tip Browser (16 GHz)	D1605-A-PS
20 GHz Complete Probe System with Solder-In Tip (20 GHz) and Positioner Tip Browser (20 GHz)	D2005-A-PS
25 GHz Complete Probe System with Solder-In Tip (25 GHz) and Positioner Tip Browser (22 GHz)	D2505-A-PS
Amplifier and Probe Tip Modules	
WaveLink D1305 13 GHz/1.6 $V_{pk\text{-}pk}$ Differential Probe Amplifier with Dxx05-SI Solder-In Tip (Qty. 2)	D1305-A
WaveLink D1605 16 GHz/1.6 $V_{pk\text{-}pk}$ Differential Probe Amplifier with Dxx05-SI Solder-In Tip (Qty. 2)	D1605-A
WaveLink D2005 20 GHz/1.6 $V_{pk\text{-}pk}$ Differential Probe Amplifier with Dxx05-SI Solder-In Tip (Qty. 2)	D2005-A
WaveLink D2505 25 GHz/1.6 $V_{pk\text{-}p}$ Differential Probe Amplifier with Dxx05-SI Solder-In Tip (Qty. 2)	D2505-A
Positioner Tip (Browser) Kits	
WaveLink Dxx05-PT (Up to 22 GHz Rating) Adjustable Positioner Tip Kit. For use with Dxx05 Amplifiers	Dxx05-PT-KIT
Probe Platform/Cable Assemblies and Adapters	
WaveLink ProLink Platform/Cable Assembly Kit for ≥ 13 GHz WaveLink Probes	WL-PLINK-A-CASE
WaveLink 2.92 mm Platform/Cable Assembly Kit for ≥ 20 GHz WaveLink Probes	WL-2.92MM-CASE
ProLink to 2.92 mm Adapter with Probe Power and Communication Pass Through	LPA-2.92

Product Description	Product Code
Accessories	
Cascade Microtech EZ-Probe Positioner	EZ PROBE
Probe Deskew and Calibration Test Fixture	TF-DSQ
Calibration Options	
NIST Calibration for D1305. Includes Test Data	D1305-A-CCNIST
NIST Calibration for D1605. Includes Test Data	D1605-A-CCNIST
NIST Calibration for D2005. Includes Test Data	D2005-A-CCNIST
NIST Calibration for D2505. Includes Test Data	D2505-A-CCNIST
Replacement Parts	
Replacement Dxx05-SI 13–25 GHz Solder-In Lead with Qty. 5 Spare Resistors	Dxx05-SI
Replacement SI Resistor Kit for Dxx05-SI Solder-In Tip	Dxx05-SI-RESISTORS
Replacement Dxx05-PT Positioner Tip	Dxx05-PT
Qty. 4 Replacement Carbon Composite Pogo-pin Tips	Dxx05-PT-TIPS
Replacement Probe Tip Holder Kit	PK600ST-3
Replacement Platform/Cable Assembly Mounting Kit	PK600ST-4
Qty. 1 Package of Black Adhesive Pads (10/pkg.) and Qty. 1 Package of White Adhesive Pads (10/pkg.)	Dxx0-PT-TAPE
Qty. 1 Package of Adhesive Probe Connection Guides (200 individual guides/package)	Dxx05-PT-GUIDES

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year.

This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

TELEDYNE LECROY
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1-800-5-LeCroy
teledynelecroy.com

Local sales offices are located throughout the world.
Visit our website to find the most convenient location.