

DH Series Probes (13 GHz – 25 GHz)



Key Features

Bandwidth models from 13 GHz to 25 GHz

Low loading and high impedance for minimal signal disturbance

Wide variety of tips:

- Standard and high-sensitivity 25 GHz solder-in tips
- High-temperature solder-in tip with 1-meter lead
- QuickLink adapter for mixed-signal probing

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

The DH series of 13 to 25 GHz active differential probes provides high input dynamic range, large offset capability, low loading and excellent signal fidelity with a range of connection options.

General Purpose Probing up to 25 GHz

Teledyne LeCroy's DH series of 13 GHz to 25 GHz differential probes offer the combination of bandwidth, input range and offset to capability to address any high-speed probing requirement - from debugging serial data interfaces to validating DDR memory systems.

Exceptional Signal Fidelity

DH series probes provide superior loading characteristics and are calibrated with a custom "fine-tuned" frequency response. The ultra-low loading and flat frequency response ensure accurate measurements.

Wide Variety of Tips

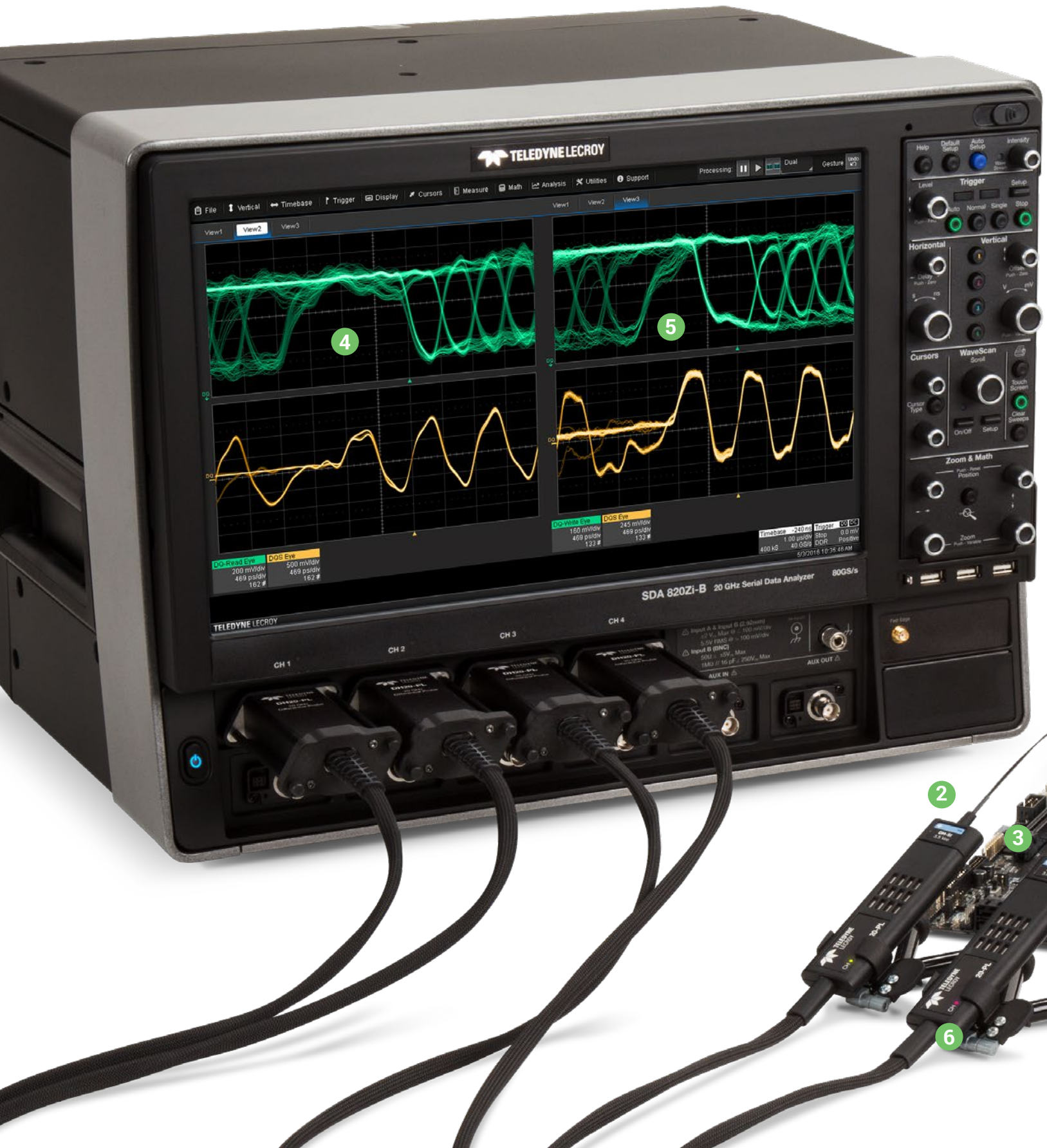
Two 25 GHz solder-in leads let you choose between a 3.5 Vpp input range for general-purpose applications, or high sensitivity with exceptionally low noise. Also available are a 1-meter long 16 GHz high-temperature tip and a QuickLink adapter for connecting mixed-signal probe tips.

Tip Identification

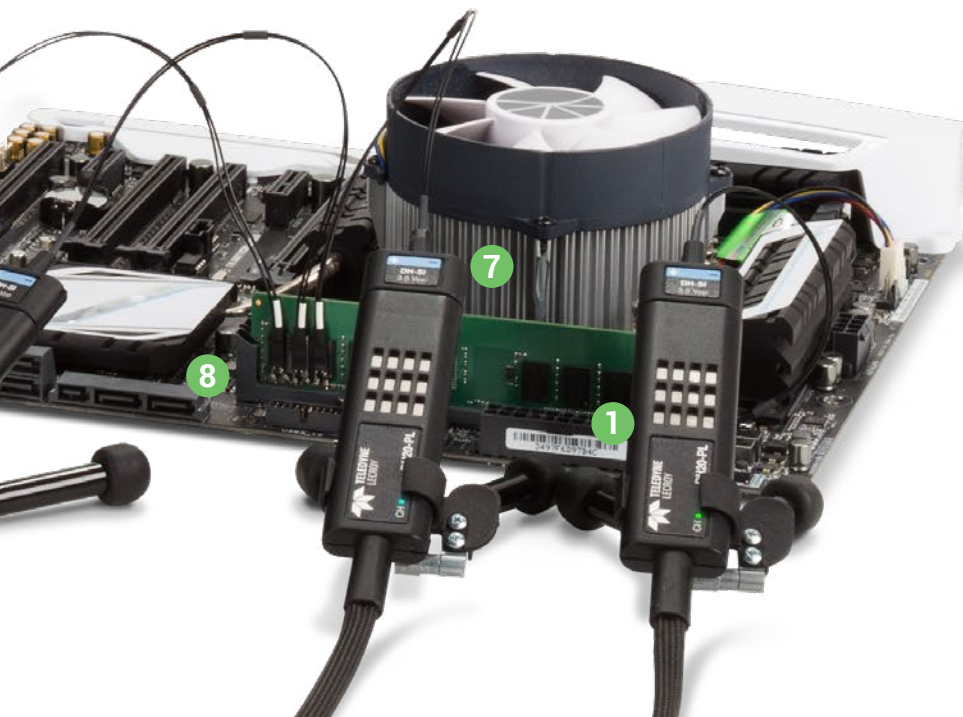
Each DH series tip has its own data onboard - the oscilloscope software automatically selects the correct tip type and precisely corrects for its effects. The result is superior signal fidelity and superior ease-of-use.

SUPERIOR SIGNAL FIDELITY AND EASE OF USE

The DH series of differential voltage probes combine a set of innovative features that make accessing high-speed signals easy with up to 25 GHz bandwidth, exceptionally low noise and superior loading characteristics.



1. **Up to 25 GHz bandwidth** with wide input voltage range and offset capabilities
2. **Tip identification** eliminates setup errors by automatically detecting tip type
3. **Onboard tip calibration data** optimizes signal fidelity and accuracy
4. **Exceptional noise performance** for cleaner signals and better measurements
5. **Superior loading characteristics** mean probe does not impact device performance
6. **Compact one-piece design** with a low-profile amplifier reduces clutter
7. **Robust mechanical design** for excellent tip retention and long-term reliability
8. **Small tip geometry and long leads** for embedded systems with DDR memory and other high-density components



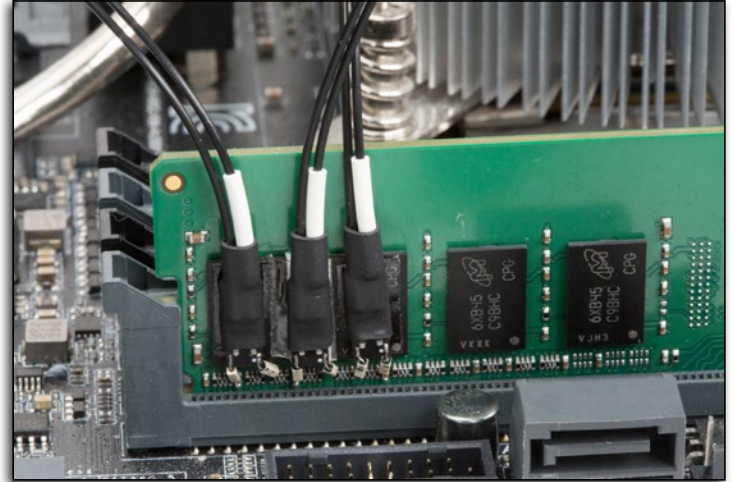
WIDE VARIETY OF TIPS

The same solder-in, high-temperature and QuickLink tips are compatible with all DH series probes and can be interchanged between any probes in the series for ultimate flexibility in the lab. Each tip contains its own identification and calibration data for accurate signal reproduction and superior ease of use.

Solder-In Tips (DH-SI and DH-SI-HS)

The 25 GHz DH series solder-in tips are extremely small to facilitate access to signals on tightly-packed boards, with a 9-inch lead length to help reach difficult probing points.

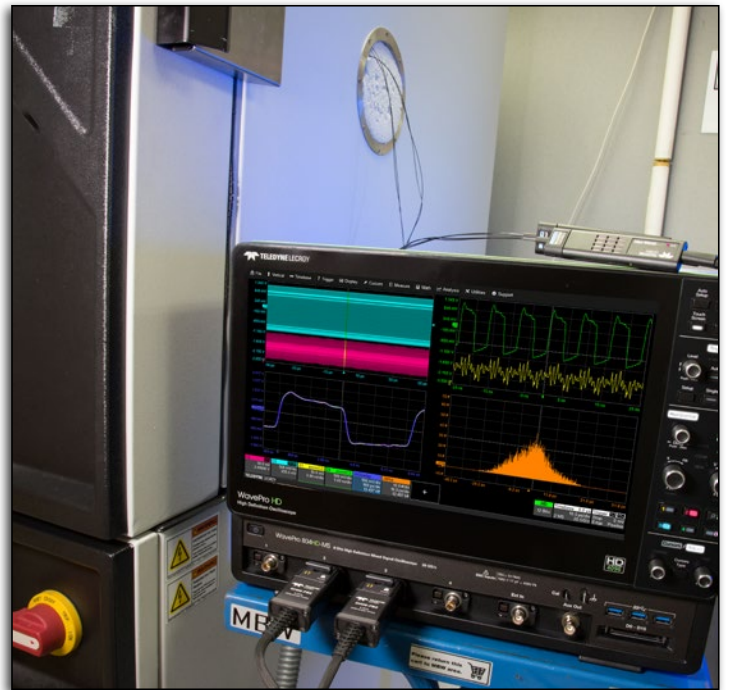
The standard DH-SI tip has a 3.5 Vpp input range, perfect for DDR memory and other general-purpose, high-speed serial signal applications. For smaller signals where low noise is critical, the DH-SI-HS high-sensitivity tip has a 2.0 Vpp input range and exceptional noise performance.



High Temperature Tip (DH-HITEMP)

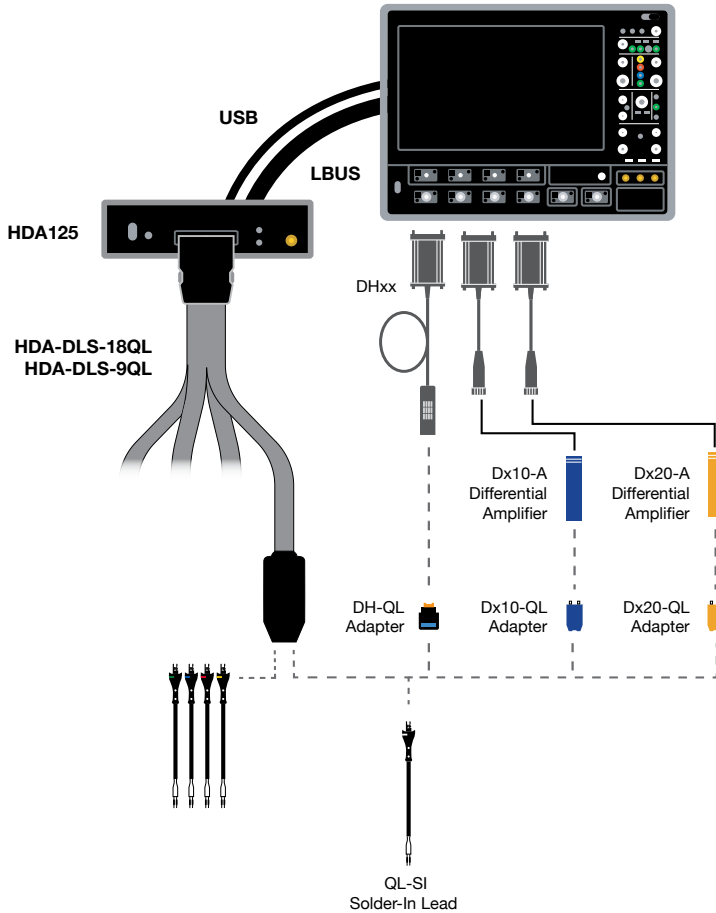
For tests where the device must be placed in an environmental chamber, the DH-HITEMP tip allows the solder-in probe tip to be separated from the probe amplifier by up to 1 meter.

The tip offers 16 GHz bandwidth, 3.5 Vpp input range, and an operating temperature range of -40 °C to +125 °C, making it ideal for environmental testing of a wide variety of high-speed devices.



QUICKLINK MIXED-SIGNAL PROBING

The QuickLink probe tip system was designed to be compatible with both the HDA125 High-speed Digital Analyzer system and with Teledyne LeCroy's selection of differential analog probes. Equip your system under test with QuickLink tips at all desired test points, and swap connections between digital and analog acquisition systems as needed.



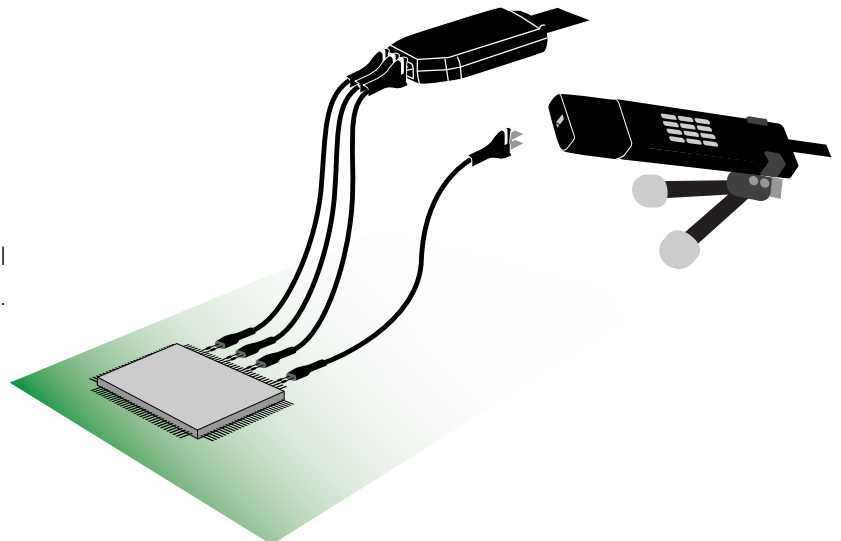
Mixed-signal Flexibility

When connected to a Teledyne LeCroy analog differential probe, QuickLink tips provide 8 GHz of bandwidth and a flat, well-controlled frequency response. When used with the HDA125 for digital acquisitions, they support 3 GHz bandwidth with industry-leading sensitivity.

The HDA125 provides the ability to acquire and analyze DDR command bus signals and other high-speed digital buses directly alongside time-correlated analog signals on the standard oscilloscope channels.

QuickLink Adapter (DH-QL)

The DH-QL adapter enables QuickLink solder-in probe tips to be used with any DH series probe. For embedded systems validation and debug, these tips can be used for both analog probing with the DH series probes and digital acquisitions with the HDA125 high-speed digital analyzer.



SPECIFICATIONS

| | DH13 | DH16 | DH20 | DH25 |
|--|-----------------------|---|-----------------------|-----------------------|
| Bandwidth* | | | | |
| Bandwidth (probe only) | 13 GHz | 16 GHz | 20 GHz | 25 GHz |
| Bandwidth with DH-SI or DH-SI-HS tip | 13 GHz | 16 GHz | 20 GHz | 25 GHz |
| Bandwidth with DH-HITEMP tip | 13 GHz | 16 GHz | 16 GHz | 16 GHz |
| Bandwidth with DH-QL adapter and QL-SI tip | 8 GHz | 8 GHz | 8 GHz | 8 GHz |
| Rise Time* | | | | |
| Rise Time (10-90%) | 34.5 ps | 28 ps | 22.5 ps | 18 ps |
| Rise Time (20-80%) | 23 ps | 19 ps | 15 ps | 12 ps |
| Probe noise (referred to input) | | | | |
| With DH-SI-HS tip | 1.7 mV _{rms} | 1.9 mV _{rms} | 2.1 mV _{rms} | 2.4 mV _{rms} |
| With all other tips | 3.6 mV _{rms} | 3.8 mV _{rms} | 4.2 mV _{rms} | 4.8 mV _{rms} |
| Probe noise density (referred to input) | | | | |
| With DH-SI-HS tip | | 15 nV/rt(Hz) | | |
| With all other tips | | 30 nV/rt(Hz) | | |
| Input | | | | |
| Input Dynamic Range | | | | |
| With DH-SI-HS tip | | 2.0 V _{pp} (±1.0 V) | | |
| With all other tips | | 3.5 V _{pp} (±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 | | |
| Operating (Probe and all other tips) | | 0 °C to 40 °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 | | |
| Dimensions | | | | |
| DH-SI and DH-SI-HS tips | | 0 to 9 mm (0 to 0.35") tip spread at circuit connection 10" overall length | | |
| DH-HITEMP tip | | 0 to 9 mm (0 to 0.35") tip spread at circuit connection 1 m overall length | | |
| Cable length | | 1.2 m | | |

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

ORDERING INFORMATION

Product Description

Complete Differential Probes

| Product Description | Product Code |
|--|--------------|
| 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 |

Solder-in Tips

| Product Description | Product Code |
|--|--------------|
| DH series solder-in tip, 25 GHz BW, 3.5 Vpp range | DH-SI |
| DH series high-sensitivity solder-in tip, 25 GHz BW, 2.0 Vpp range | DH-SI-HS |

High-temperature Tips

| Product Description | Product Code |
|--|--------------|
| DH series high-temperature solder-in tip, 16 GHz BW, 3.5 Vpp range | DH-HITEMP |

QuickLink Adapters and Kits

| Product Description | Product Code |
|---|--------------|
| DH series QuickLink adapter, 8 GHz BW | DH-QL |
| DH series QuickLink adapter kit with 3 x QL-SI tips | DH-QL-3SI |

Accessories

| Product Description | Product Code |
|--|--------------|
| 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 Code

Product Description

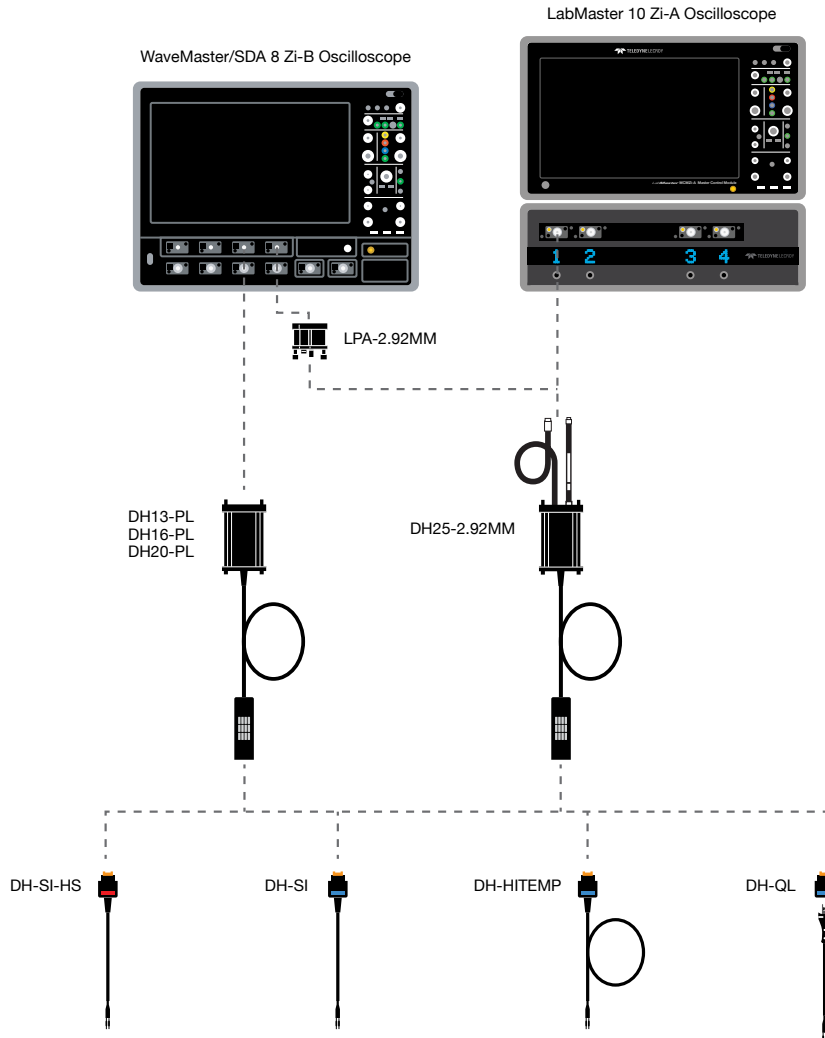
Calibration Options

| Product Description | Product Code |
|--|--|
| 3-year warranty | DH13-W3, DH16-W3, DH20-W3, DH25-W3 |
| 5-year warranty | DH13-W5, DH16-W5, DH20-W5, DH25-W5 |
| 3-year annual NIST calibration | DH13-C3, DH16-C3, DH20-C3, DH25-C3 |
| 5-year annual NIST calibration | DH13-C5, DH16-C5, DH20-C5, DH25-C5 |
| 3-year warranty with annual NIST calibration | DH13-T3, DH16-T3, DH20-T3, DH25-T3 |
| 5-year warranty with annual NIST calibration | DH13-T5, DH16-T5, DH20-T5, DH25-T5 |
| NIST traceable calibration with test data | DH13-CCNIST, DH16-CCNIST, DH20-CCNIST, DH25-CCNIST |

Replacement Parts

| Product Description | Product Code |
|---|-----------------|
| Replacement SI resistor kit for DH-SI and DH-SI-HS solder-in tips | DH-SI-RESISTORS |

Compatibility Chart



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



1-800-5-LeCroy
teledynelecroy.com

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