

Differential Probes

TDP1500, TDP3500 and TDP4000 Datasheet



Differential active probes provide truer signal reproduction and fidelity for high-frequency measurements. With ultra-low input capacitance and versatile device-under-test connection capabilities, the TDP1500, TDP3500 and TDP4000 Differential-ended Active probes provide excellent high-speed electrical and mechanical performance required for today's digital system designs.

Key performance specifications

- 4 GHz (TDP4000), 3.5 GHz (TDP3500) and 1.5 GHz (TDP1500) probe bandwidth
- ≤ 1 pF (TDP1500) and ≤ 0.3 pF (TDP3500/TDP4000) differential input capacitance
- 200 k Ω (TDP1500) and 100 k Ω (TDP3500/TDP4000) differential input resistance
- ± 25 V (TDP1500) and ± 15 V (TDP3500/TDP4000) DC + pk AC input voltage (non-destruct)
- >60 dB at 1 MHz and >25 dB at 1 GHz CMRR

Key features

- Outstanding electrical performance
 - 4 GHz, 3.5 GHz and 1.5 GHz bandwidth models - accurate measurements for serial and digital applications
 - Excellent common mode rejection – reduces measurement errors in higher common environments
 - Low capacitive and resistive loading – maintains signal fidelity and reduces DC biasing interactions
- Versatile mechanical performance

- Compact probe head size for probing small geometry circuit elements
- DUT attachment accessories enable connection to fine-spaced SMDs
- Robust design for reliability
- Easy to use
 - Connects directly to oscilloscopes with the TekVPI™ probe interface
 - Provides automatic units scaling and readout on the oscilloscopes display
 - Easy access to probe comp box controls or oscilloscope probe menu display for probe status, setup control, and diagnostic information
- Integrated Scope/Probe system
 - Direct connection to and powered from the TekVPI™ oscilloscope interface (Connects directly to TekVPI scopes without the need of an external power supply, like many competitors require)
 - Single-button oscilloscope probe menu access
 - Setup and control from probe comp box or oscilloscope user interface
 - AutoZero - zeros out output offset
 - Remote GPIB/USB probe control through the oscilloscope

Applications

- Design, validation, debugging, and characterization of common high-speed serial bus designs:
 - I²C
 - CAN/LIN
 - SPI
 - Serial ATA
 - Ethernet (GbE)
 - USB 2.0
 - FireWire (1394b)
- Signal integrity, jitter, and timing analysis
- Manufacturing, engineering, and test



A better measurement tool

Specifically designed for use and direct connection to oscilloscopes with the TekVPI™ probe interface, the TDP1500, TDP3500 and TDP4000 Differential probes achieve high-speed signal acquisition and measurement fidelity by solving three traditional problems:

- DUT loading effects - Are reduced by lower input capacitance and high input resistance
- DUT connectivity - A variety of accessories exist for attaching to small SMDs, some come standard or recommended
- Maximizing of system (oscilloscope and probe) bandwidth - Probing solutions for all measurements for TekVPI interface oscilloscope models up to 4 GHz

For the best probe support, download and install the latest version of the oscilloscope software from www.tek.com/software/downloads.

Specifications

All specifications are guaranteed unless noted otherwise. All specifications apply to all models unless noted otherwise.

Warranted characteristics

Bandwidth (probe only)

TDP1500	≥1.5 GHz warranted
---------	--------------------

Rise time (probe only)

TDP1500	<265 ps
TDP3500	≤140 ps

CMRR

TDP1500

Frequency range	8.5 V range	0.85 V range
1 MHz	>45 dB	>60 dB
100 MHz	>25 dB	>38 dB
500 MHz	>20 dB	>35 dB
1 GHz	>18 dB	>30 dB

Maximum input voltage (nondestruct)

TDP1500	±25 V (DC + pk AC)
TDP3500	±15 V (DC + pk AC)
TDP4000	±15 V (DC + pk AC)

Typical characteristics

Attenuation

TDP1500	1X, 10X
TDP3500	5X

Bandwidth (probe only)

TDP3500	≥3.5 GHz
TDP4000	≥4 GHz

Rise time (probe only)

TDP4000	≤125 ps
---------	---------

CMRR**TDP3500, TDP4500**

Frequency	CMRR
DC	>60 dB
1 MHz	>55 dB
30 MHz	>45 dB
1 GHz	>25 dB

Differential input capacitance

TDP1500	<1 pF
TDP3500	<0.3 pF
TDP4000	<0.3 pF

Differential input resistance

TDP1500	200 kΩ
TDP3500	100 kΩ
TDP4000	100 kΩ

Noise level

TDP1500	< 2 mV RMS (0.85 V range) < 1 mV RMS (8.5 V range)
TDP3500	$< 35 \frac{nV}{\sqrt{Hz}}$ at 100 MHz
TDP4000	$< 35 \frac{nV}{\sqrt{Hz}}$ at 100 MHz

Propagation delay	5.4 ns ± 0.2 ns
-------------------	-----------------

Common mode input range

TDP1500	± 7 V; 5 V RMS
TDP3500	+5 V to -4 V
TDP4000	+5 V to -4 V

Input offset range

TDP1500	±7 V (10X or 1X)
TDP3500	±1 V displayed
TDP4000	±1 V displayed

Differential input dynamic range

TDP1500	±8.5 V ; 6 V RMS (10X) ±850 mV ; 0.6 V RMS (1X)
TDP3500	±2 V
TDP4000	±2 V

Nominal characteristics

Recommended oscilloscope interface TekVPI™ Probe

Power requirements

Power requirements Powered directly by oscilloscopes with the TekVPI probe interface.

Physical characteristics

Dimensions

Dimension	millimeters (mm)	inches (in)
Cable length ¹	1200	48

Weight

Model (probe only)	grams (g)	ounces (oz)
TDP1500, TDP3500, TDP4000 ¹	160	5.4

¹ Typical for TDP1500.

Ordering information

Models

TDP1500	1.5 GHz Differential Probe with TekVPI™ Probe Interface, Certificate of Traceable Calibration Standard.
TDP3500	3.5 GHz Differential Probe with TekVPI™ Probe Interface, Certificate of Traceable Calibration Standard.
TDP4000	4 GHz Differential Probe with TekVPI™ Probe Interface, Certificate of Traceable Calibration Standard.

Options

Language options

Opt. L0	English manual
Opt. L5	Japanese manual
Opt. L7	Simplified Chinese manual

Service options

Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
Opt. D1	Calibration Data Report
Opt. D3	Calibration Data Report 3 Years (with Opt. C3)
Opt. D5	Calibration Data Report 5 Years (with Opt. C5)
Opt. R3	Repair Service 3 Years (including warranty)
Opt. R5	Repair Service 5 Years (including warranty)
Opt. SILV900	Standard warranty extended to 5 years

Accessories

TDP1500 standard accessories

Description	Quantity shipped	Reorder part number	Reorder quantity
Pouch, nylon carrying case with inserts	1 each	016-1952-xx	1 each
Certificate of traceability	1 each	Standard with probe	1 each
Accessory kit TDP1500 (see contents listed below, 0 through 10)	1 each	020-2702-xx	1 each

Table continued...

Description	Quantity shipped	Reorder part number	Reorder quantity
Plastic accessory box	1 each	006-7164-xx	--
Straight pins	8 each	016-1891-xx	8 each
Longhorn VIA adapter	2 each	016-1780-xx	5 each
1-inch solder down	1 each	196-3504-xx	1 each
3-inch solder down	1 each	196-3505-xx	1 each
Y-lead adapter	2 each	196-3434-xx	1 each
Micro CKT test tip	3 each	206-0569-xx	1 each
Tip saver	2 each	016-1781-xx	2 each
3-inch ground lead	2 each	196-3437-10	2 each
Marker band set (2 each of 5 colors)	1 each	016-1315-xx	1 each

TDP3500 and TDP4000 standard accessories

Description	Quantity shipped	Reorder part number	Reorder quantity
Pouch, nylon carrying case with inserts	1 each	016-1952-xx	1 each
Certificate of traceability	1 each	Standard with probe	1 each
Probe tip cover	1 each	200-4236-xx	1 each
Antistatic wrist strap	1 each	006-3415-xx	1 each
Accessory kit TDP3500/TDP4000 containing:	1 each	020-2883-xx	1 each
Plastic accessory box	1 each	006-7164-xx	--
Square pin adapter	4 each	016-1884-xx	4 each
Variable spacing tip adapter	4 each	016-1885-xx	4 each
Y-lead adapter	2 each	196-3434-xx	1 each
Micro CKT test tip	3 each	206-0569-xx	1 each
3-inch ground lead	2 each	196-3469-xx	2 each
Marker band set (2 each of 5 colors)	1 each	016-1315-xx	1 each
Accessory kit (solder-in differential probes TDP3500/TDP4000, P6330, P7330, P7350) containing:	1 each	020-2505-xx	1 each

Table continued...

Description	Quantity shipped	Reorder part number	Reorder quantity
Adapter, resistor/wire	2 each	016-1926-xx	2 each
Wire assembly w/ 0.02 diameter	10 each	016-1930-xx	10 each
Wire assembly w/ 0.008 diameter	10 each	016-1931-xx	10 each
10 Ω resistor w/ 0.02 diameter wire	10 each	016-1927-xx	10 each
10 Ω resistor w/ 0.008 diameter wire	10 each	016-1933-xx	10 each
20 Ω resistor w/ 0.02 diameter wire	10 each	016-1928-xx	10 each
20 Ω resistor w/ 0.008 diameter wire	10 each	016-1934-xx	10 each

Recommended accessories

Description	Part number	Quantity		
		TDP1500	TDP3500	TDP4000
BNC to probe tip adapter	067-1734-xx	1 each	--	--
Spring loaded grounds	016-1782-xx	1 package of 6	--	--
TwinFoot™ adapter	016-1785-xx	1 package of 4	1 package of 4	1 package of 4
TwinTip™ adapter	016-1786-xx	1 package of 4	--	--
VanTip™ adapter	016-1890-xx	1 package of 8	--	--
IC micro grabber	SMK-4	1 package of 4	1 package of 4	1 package of 4
IEEE 1394 adapter	679-5027-xx	1 each	1 each	1 each
TekVPI™ cal fixture	067-1701-xx	1 each	1 each	1 each
Short ground contacts	016-1783-xx	1 package of 10	--	--



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

ASEAN / Australasia (65) 6356 3900
 Belgium 00800 2255 4835*
 Central East Europe and the Baltics +41 52 675 3777
 Finland +41 52 675 3777
 Hong Kong 400 820 5835
 Japan 81 (3) 6714 3086
 Middle East, Asia, and North Africa +41 52 675 3777
 People's Republic of China 400 820 5835
 Republic of Korea +822 6917 5084, 822 6917 5080
 Spain 00800 2255 4835*
 Taiwan 886 (2) 2656 6688

Austria 00800 2255 4835*
 Brazil +55 (11) 3759 7627
 Central Europe & Greece +41 52 675 3777
 France 00800 2255 4835*
 India 000 800 650 1835
 Luxembourg +41 52 675 3777
 The Netherlands 00800 2255 4835*
 Poland +41 52 675 3777
 Russia & CIS +7 (495) 6647564
 Sweden 00800 2255 4835*
 United Kingdom & Ireland 00800 2255 4835*

Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
 Canada 1 800 833 9200
 Denmark +45 80 88 1401
 Germany 00800 2255 4835*
 Italy 00800 2255 4835*
 Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90
 Norway 800 16098
 Portugal 80 08 12370
 South Africa +41 52 675 3777
 Switzerland 00800 2255 4835*
 USA 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.tek.com.

Copyright © Tektronix, Inc. All rights reserved. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX and TEK are registered trademarks of Tektronix, Inc. All other trade names referenced are the service marks, trademarks, or registered trademarks of their respective companies.

18 Mar 2021 51W-20565-9
www.tek.com

Tektronix®

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Tektronix:](#)

[TDP1500](#) [TDP3500](#)