

Differential Probes

TDP1500 and TDP3500 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 and TDP3500 Differential-ended Active probes provide excellent high-speed electrical and mechanical performance required for today's digital system designs.

Key performance specifications

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

Key features

- Outstanding electrical performance
 - 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 oscilloscope 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 and TDP3500 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 3.5 GHz

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

Specifications

All specifications apply to all models unless noted otherwise.

Warranted characteristics

Bandwidth (probe only)

TDP1500	≥1.5 GHz warranted
TDP3500	≥3.5 GHz warranted

Attenuation

TDP1500	1X, 10X
TDP3500	5X

CMMR

>60 dB at 1 MHz, >25 dB at 1 GHz

Maximum input voltage (nondestruct)

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

Typical characteristics

Rise time (probe only)

TDP1500	≤265 ps
TDP3500	≤110 ps

Differential input capacitance

TDP1500	≤1 pF
TDP3500	≤0.3 pF

Differential input resistance

TDP1500	200 kΩ
TDP3500	100 kΩ

Noise level

TDP1500	$< 50 \frac{\text{nV}}{\sqrt{\text{Hz}}}$
TDP3500	$\approx 35 \frac{\text{nV}}{\sqrt{\text{Hz}}}$

Propagation delay

5.4 ns

Common mode input range

TDP1500	±7 V (1X)
	±7 V (10X)
TDP3500	+5 V to -4V

Input offset range

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

Differential input dynamic range

TDP1500	±8.5 V (10X)
	±850 mV (1X)
TDP3500	±2 V

Datasheet

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 ²	160	5.4

¹ Typical for TDP1500.

² 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.

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
Documentation kit TDP1500, includes:	1 each of selected language	020-2866-xx (English with Standard) 020-2891-xx (Japanese with Option L5) 020-2892-xx (Simplified Chinese with Option L7)	1 each of selected language
Printed user manual (071-2209-xx, English; 071-2210-xx, Japanese; 071-2211-xx, Simplified Chinese)			
CD containing PDF-only technical reference manual, 071-2296-xx, English			
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
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

Datasheet

Description	Quantity shipped	Reorder part number	Reorder quantity
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-xx	2 each
Marker band set (2 each of 5 colors)	1 each	016-1315-xx	1 each
Accessory performance summary and reorder sheet	1 each	001-1412-xx	1 each

TDP3500 standard accessories

Description	Quantity shipped	Reorder part number	Reorder quantity
Pouch, nylon carrying case with inserts	1 each	016-1952-xx	1 each
Documentation kit TDP3500, includes:	1 each of selected language	020-2867-xx (English with Standard) 020-2893-xx (Japanese with Option L5) 020-2894-xx (Simplified Chinese with Option L7)	1 each of selected language
Printed user manual (071-2212-xx, English; 071-2213-xx, Japanese; 071-2214-xx, Simplified Chinese)			
CD containing PDF-only technical reference manual, 071-2297-xx, English			
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 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 performance summary and reorder sheet	1 each	001-1435-xx	1 each
Accessory kit (solder-in differential probes TDP3500, P6330, P7330, P7350) containing:	1 each	020-2505-xx	1 each
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
10Ω resistor w/ 0.02 diameter wire	10 each	016-1927-xx	10 each
10Ω resistor w/ 0.008 diameter wire	10 each	016-1933-xx	10 each

	Description	Quantity shipped	Reorder part number	Reorder quantity
	20Ω resistor w/ 0.02 diameter wire	10 each	016-1928-xx	10 each
	20Ω resistor w/ 0.008 diameter wire	10 each	016-1934-xx	10 each

Recommended accessories

Description	Part number	Quantity	
		TDP1500	TDP3500
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
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
IEEE 1394 adapter	679-5027-xx	1 each	1 each
TekVPI™ cal fixture	067-1701-xx	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 3010
Middle East, Asia, and North Africa +41 52 675 3777
People's Republic of China 400 820 5835
Republic of Korea 001 800 8255 2835
Spain 00800 2255 4835*
Taiwan 886 (2) 2722 9622

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

Updated 10 April 2013

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.tektronix.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.



24 May 2013

51W-20565-6

www.tektronix.com



 **S J ELECTRONICS**
POWER • TEST & MEASUREMENT

0800 583 4455
www.sjelectronics.co.uk
sales@sjelectronics.co.uk