Tektronix®

Differential Probes

P6248·P6247·P6246 Datasheet



P6248

The P6248, P6247, and P6246 Differential Probes enable users to make time-domain or frequency-domain measurements on high-bandwidth signals commonly found in disk drive, digital IC design (RAMBUS), and communication applications (Gigabit Ethernet, IEEE-1394 Firewire, and Fibre Channel). The P6248 includes accessories that allow RAMBUS via probing and IEEE-1394 interconnect access. The small probe head geometry and assorted probe tip accessories allow these probes to easily accommodate manual probing of surface-mount devices while maintaining high CMRR.

P6248 key performance specifications

- ≥1.5 GHz bandwidth (guaranteed)
- 1.7 GHz (typical, ≤27 °C) 1X mode
- 1.85 GHz (typical, ≤27 °C) 10X mode

P6247 key performance specifications

- ≥1.0 GHz bandwidth (guaranteed)

P6246 key performance specifications

- ≥400 MHz bandwidth (guaranteed)

Key features

- Low input capacitance: <1 pF differential
- Probe input connector: two standard 0.025 in./0.63 mm (0.1 in. center) square pin receptacle (female)
- Electrostatic discharge tolerant (IEC 801-2)
- For use with oscilloscopes, spectrum analyzers, or network analyzers
- >60 dB (1000:1) Common Mode Rejection Ratio (CMRR)
- Small probe head allows easy probing of SMDs

Connectivity

- Connects to TekProbe® BNC interface on TDS Series oscilloscopes or other instruments using 1103 TekProbe® Power Supply

Applications

- Communications (Gigabit ethernet, IEEE-1394, fibre channel)
- Semiconductor characterization (RAMBUS)
- Disk drive read channel design
- Communication pulse shape compliance
- Jitter, crosstalk, and BERT measurements
- Location of ground bounce

P6248, P6247, and P6246 Differential Probes

The P6248, P6247, and P6246 Differential Probes are ideal for design verification of disk drive read, channel electronics, and timing analysis for troubleshooting ground-bounce problems associated with high-speed logic. They can also be used for pulse shape or crosstalk compliance testing of high-speed communication signals.

Specifications

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

Model overview

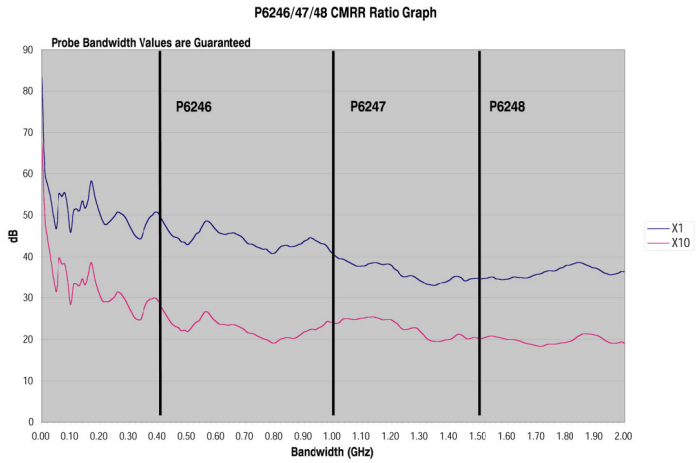
Characteristic	P6248	P6247	P6246
Bandwidth (guaranteed)	≥1.5 GHz	≥1.0 GHz	≥400 MHz
Rise time (specified)	<265 ps	<350 ps	<875 ps
Attenuation settings	X1, X10	X1, X10	X1, X10
DC attenuation accuracy	±2%	±2%	±2%
Common mode input voltage range	±7.0 V, 1X ±7.0 V, 10X	±7.0 V, 1X ±7.0 V, 10X	±7.0 V, 1X ±7.0 V, 10X
Differential mode input voltage range	±850 mV, 1X ±8.5 V, 10X	±850 mV, 1X ±8.5 V, 10X	±850 mV, 1X ±8.5 V, 10X
Maximum nondestructive input voltage	±25 V (DC + peak AC)	±25 V (DC + peak AC)	±25 V (DC + peak AC)
Electrostatic immunity	15 kV	15 kV	15 kV
Bandwidth limit	-	Switchable, 200 MHz	Switchable, 200 MHz
Lower frequency limit, DC reject mode	-	0.4 Hz, 1X 4.0 Hz, 10X	0.4 Hz, 1X 4.0 Hz, 10X
Probe interface	TekProbe® Level II [1]	TekProbe® Level II [1]	TekProbe® Level II [1]

1 The TekProbe® Level II interface supports probe power, auto scaling, auto termination with TDS oscilloscopes.

Warranted characteristics

CMRR

Frequency	Attenuation setting	P6246	P6247	P6248
1 MHz	÷1	>60 dB	>60 dB	>60 dB
	÷10	>45 dB	>45 dB	>45 dB
100 MHz	÷1	>38 dB	>38 dB	>38 dB
	÷10	>25 dB	>25 dB	>25 dB
500 MHz	÷1	N/A	>35 dB	>35 dB
	÷10	N/A	>20 dB	>20 dB
1 GHz	÷1	N/A	>30 dB	>30 dB
	÷10	N/A	>18 dB	>18 dB
1.5 GHz	÷1	N/A	N/A	>25 dB (typical)
	÷10	N/A	N/A	>18 dB (typical)



Typical characteristics

Input capacitance

Differential mode	<1 pF
Common mode	<2 pF

Input resistance

Differential mode	200 kΩ
Common mode	100 kΩ

Linearity	±2%
Noise	<50 nV/squareroot Hz
Harmonic distortion	≤1.5%

Passband ripple < ±0.25 dB

P6248	DC to 1.5 GHz
P6247	DC to 850 MHz
P6246	DC to 400 MHz

Output termination	Terminate into 50 Ω

Physical characteristics

Weight (probe only)	160 g (0.36 lb.)
Probe head dimensions (H×W×D)	9.3 mm × 12 mm × 78 mm (0.36 in. × 0.47 in. × 3.0 in.)
Input connection dimensions	0.63 mm (0.025 in.) square pins on 2.54 mm (0.1 in.) centers
Cable length	1.2 m (47 in.)

Environmental characteristics

Temperature	
Operating	0 °C to +50 °C
Nonoperating	–55 °C to +75 °C
Humidity	(0 to 90% RH)
Operating	+30 °C to +50 °C
Nonoperating	+30 °C to +60 °C

Ordering information

Models

P6248	1.5 GHz Differential Probe
P6247	1.0 GHz Differential Probe
P6246	400 MHz Differential Probe

P6248 standard accessories

Accessory	Quantity	Reorder part number [2]
Certificate of traceable calibration	1	-
Carrying case	1	016-1952-XX
User manual (English)	1	071-0566-XX
Service manual	1	071-0573-XX
Tektronix probes care and handling reference	1	071-2870-XX
Probe Tip Accessory kit	1	020-2702-XX
Accessory box	1	006-7164-XX
Color coding bands, 2 each of 5 colors	1	016-1315-XX
Probe tip connector saver	2	016-1781-XX (set of 2)
Straight tip	8	016-1891-XX (set of 8)
Y-lead adapter	2	196-3434-XX
3 in. ground lead	2	196-3437-XX
1 in. solder down	1	196-3504-XX
3 in. solder down	1	196-3505-XX
TwinTip™ adapter	2	206-0490-XX
Micro CKT test tip	3	206-0569-XX

2 Reorder quantities may differ from the original included quantities.


Tektronix
016-1783-XX
SHORT GROUND
CONTACTS
SET of 10
Tektronix
016-1782-XX
SPRING LOADED
GROUND PINS
SET of 6
Tektronix
016-1786-XX
TwinTip™ ADAPTER
SET of 4
Tektronix
016-1780-XX
LONGHORN VIA
ADAPTER
SET of 5
Tektronix
016-1785-XX
TwinFoot™ ADAPTER
SET of 4
Tektronix
016-1781-XX
TIP SAVER
SET of 2
016-1315-XX
Coding Color Clips
679-4094-XX
BNC to
Probe Tip Adapter
Straight Tip
016-1891-XX
VariTip
016-1890-XX
013-0309-XX
206-0569-XX
Micro CKT Test Tip
Y Lead
196-3436-XX
6" Ground Leads
196-3436-XX
3" Ground Leads
196-3437-XX

P6247 / P6246 standard accessories

Accessory	Quantity	Reorder part number [3]
Certificate of traceable calibration	1	-
Carrying case	1	016-1952-XX
User manual (English, German, French, Japanese)	1	070-9898-XX
Service manual	1	070-9899-XX
Tektronix probes care and handling reference	1	071-2870-XX
BNC to probe tip adapter	1	679-4094-XX
Accessory kit	1	020-2380-XX
Accessory box	1	006-7164-XX
Color coding bands, 2 each of 5 colors	1	016-1315-XX
Short ground contact (131-6247-XX)	2	016-1983-XX (set of 10)
Spring loaded ground (131-6271-XX)	2	016-1782-XX (set of 6)
Lead set	1	196-3435-XX
TwinFoot™ adapter (013-0306-XX)	2	016-1785-XX (set of 4)
TwinTip™ adapter (013-0305-XX)	1	016-1786-XX (set of 4)
Y-lead adapter	1	196-3434-XX
6 in. ground lead	1	196-3436-XX
Micro CKT test tip	3	206-0569-XX

Optional accessories

Accessory	Part number	P6248	P6247 / P6246
Longhorn Via adapter	016-1780-XX (set of 5)	■	
Spring loaded ground	016-1782-XX (set of 6)	■	
Short ground contact	016-1783-XX (set of 10)	■	
TwinFoot™ adapter	016-1785-XX (set of 4)	■	
TwinTip™ adapter	016-1786-XX (set of 4)	■	
VariTip™ adapter	016-1890-XX (set of 8)	■	
Micro Klipclip adapter	013-0309-XX (set of 2)	■	■
Adjustment tool	003-0675-XX	■	
Probe tip to BNC adapter	679-4094-XX	■	
P6046/HP1141A probe tip adapter	013-0304-XX	■	■
IEEE 1394 adapter	679-5027-XX	■	■
TPA-BNC (connect the probe to TekVPI oscilloscopes)	TPA-BNC	■	■
TCA-BNC (connect the probe to TekConnect oscilloscopes)	TCA-BNC	■	■
50 Ω termination	011-0049-XX	■	■

3 Reorder quantities may differ from the original included quantities.

Accessory	Part number	P6248	P6247 / P6246
50 Ω BNC cable, 20 in.	012-0076-XX	■	■
50 Ω SMA (F) to BNC (M) adapter	015-0572-XX	■	■
TekProbe® II Power Supply for interfacing with other BNC instruments; Power plug options for 1103:	1103	■	■
North America (115 V, 60 Hz)	Opt. A0	-	-
Universal Euro (220 V, 50 Hz)	Opt. A1	-	-
United Kingdom (240 V, 50 Hz)	Opt. A2	-	-
Australia (240 V, 50 Hz)	Opt. A3	-	-
Switzerland (220 V, 50 Hz)	Opt. A5	-	-
Japan (100 V, 110/120 V, 60 Hz)	Opt. A6	-	-
China (50 Hz)	Opt. A10	-	-
India (50 Hz)	Opt. A11	-	-
Brazil (60 Hz)	Opt. A12	-	-
No power cord (instrument set to 230 V)	Opt. A99	-	-

Service options

Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
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. SILV600	Standard warranty extended to 5 years
Opt. SILV900	Standard warranty extended to 5 years

CE Marking Not Applicable.

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

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