

# Differential Probes

P6248 • P6247 • P6246



## Features and Benefits

### P6248

- 1.7 GHz (Typical Probe Only  $\leq 27^{\circ}\text{C}$ )  
1x Mode
- 1.85 GHz (Typical Probe Only  $\leq 27^{\circ}\text{C}$ )  
10x Mode

### FAMILY FEATURES & BENEFITS

- 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)
- Connects to TEKPROBE<sup>®</sup> Interface on TDS Series Scope, or Other Instruments Using 1103 TEKPROBE Power Supply
- For Use with Oscilloscopes, Spectrum or Network Analyzers
- $>60$  dB (1000:1) Common Mode Rejection Ratio (CMRR)
- Small Probe Head Allows Easy Probing of SMDs



## Applications

- Communications (Gigabit Ethernet, IEEE 1394, Fibre Channel)
- Semiconductor Characterization (RAMBUS)
- Disk Drive Read Channel Design
- Communication Pulse Shape Compliance
- Jitter, Cross-Talk, BERT Measurements
- Location of Ground Bounce



## The P6246, P6247 and P6248 Differential Probes

The P6248, P6247 and P6246 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.

The P6246, P6247 and P6248 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 cross talk compliance testing of high speed communication signals.

## Characteristics

### Bandwidth (Guaranteed) –

P6248: DC to 1.5 GHz.  
P6247: DC to 1.0 GHz  
P6246: DC to 400 MHz.

### Rise Time (specified) –

$<265$  ps (P6248),  $<350$  ps (P6247),  
 $<875$  ps (P6246).

### Common Mode Rejection Ratio (CMRR) –

$<45$  dB at  $\leq 1$  MHz.  
 $<25$  dB at  $\leq 100$  MHz.  
 $<20$  dB at  $\leq 500$  MHz.  
 $<18$  dB at  $\leq 1$  GHz.  
 $<60$  dB at  $\leq 1$  MHz.  
 $<38$  dB at  $\leq 100$  MHz.  
 $<35$  dB at  $\leq 500$  MHz.  
 $<30$  dB at  $\leq 1$  GHz.  
 $<25$  dB at  $\leq 1.5$  GHz typical. (P6248)

### DC Attenuation Accuracy – $\pm 2\%$ .

### Common Input Voltage Range –

$\pm 7.0$  V, 1x;  $\pm 7.0$  V, 10x.

### Differential Input Voltage Range –

$\pm 850$  mV, 1x;  $\pm 8.5$  V, 10x.

### Max. Non-Destruct Input Voltage –

$\pm 25$  V (DC + peak AC).

### Electrostatic Immunity – $>15$ kV.

**TEKPROBE Interface** – Probe power, auto-scaling, auto-termination with TDS scopes.

### Bandwidth Limit – Switchable, 200 MHz

(P6246 & P6247).

### DC Reject – 0.4 Hz, 1x; 4.0 Hz, 10x

(P6246 & P6247).



See Tektronix on the World Wide Web:  
<http://www.tektronix.com>



Tektronix measurement products  
are manufactured in ISO  
registered facilities.

# Differential Probes

**P6248 • P6247 • P6246**

## CHARACTERISTICS CONTINUED

### TYPICAL SPECIFICATIONS

#### Input C –

<1 pF (differential mode),  
<2 pF (common mode).

#### Input R –

200 k $\Omega$  (differential mode),  
100 k $\Omega$  (common mode).

Linearity –  $\pm 2\%$ .

Noise –  $<50 \text{ nV}/\sqrt{\text{Hz}}$

Harmonic Distortion –  $\leq 1.5\%$  @ 100 MHz.

Passband Ripple –  $\pm 0.25 \text{ dB}$ .

P6248: DC to 1.5 GHz.

P6247: DC to 850 MHz.

P6246: DC to 400 MHz.

#### Output Termination –

Terminate into 50  $\Omega$ .

### PHYSICAL CHARACTERISTICS

Weight (probe only) – 160 g (0.36 lb.).

Probe Head Volume – 6 cm<sup>3</sup> (0.3 in.<sup>3</sup>).

Probe Head Input Connection – 0.63 mm (0.025 in.) square pins on 2.54 mm (0.1 in.) centers.

Output Cable Length – 1.2 m (4.0 ft.).

### ENVIRONMENTAL CHARACTERISTICS

#### Temperature –

Operating 0 to 50°C.

Non-operating –55 to +75°C.

#### Humidity (0 to 90% RH) –

Operating 30 to 50°C.

Non-operating 30 to 60°C.

## ORDERING INFORMATION

### P6248

1.5 GHz Differential Probe. (Guaranteed)

### P6247

1.0 GHz Differential Probe. (Guaranteed)

### P6246

400 MHz Differential Probe. (Guaranteed)

#### Hard Case –

P6248, P6247 Order 006-7340-00.

P6246 Order 016-0156-03.

#### Certificate of Traceable Calibration

#### P6246 and P6247 User Manual Set –

English, German, French, and Japanese: Order 070-9898-02.

Service: 071-9899-01.

P6248 Instruction Manual – English: Order 071-0566-00.

Service Manual – English: Order 071-0573-00.

### MEASUREMENT SERVICE OPTIONS

Opt. D1 – Calibration Data.

Opt. R3 – 3 Years Extended Warranty.

Opt. C3 – 3 Years Calibration Services.

### RECOMMENDED/REPLACEMENT ACCESSORIES

50  $\Omega$ , BNC (M) to BNC (M) Coaxial Cable – 18 in.  
Order 012-0076-00.

50  $\Omega$ , BNC Coaxial Terminator – Order 011-0049-01.

50  $\Omega$ , SMA (F) to BNC (M) Adapter – 015-0572-00.

### INCLUDED ACCESSORIES

| Product Name/Description            | P6246 & P6247 Quantity | P6248 Quantity   | Order                           |
|-------------------------------------|------------------------|------------------|---------------------------------|
| Y Lead Adapter                      | 2 Each                 | 2 Each           | 196-3462-00                     |
| 3" Ground Lead                      | 2 Each                 | 4 Each           | 196-3462-00                     |
| 6" Ground Lead                      | 2 Each                 | 2 Each           | 196-3462-00                     |
| SMK4                                | 2 Each                 | 4 Each           | SMK4<br>(1 package of 4)        |
| SMT KlipChip                        | 3 Each                 | 4 Each           | 206-0364-00<br>(1 per package)  |
| BNC to Probe Tip Adapter            | 1 Each                 | 1 Each           | 013-0304-00                     |
| Twin Foot-<br>Package 4 each        | 2 Each                 | 4 Each           | 016-1785-00<br>(1 package of 4) |
| Twin Tip Adapter-<br>Package 4 each | 2 Each                 | 4 Each           | 016-1786-00<br>(1 package of 4) |
| Short Ground Contact                | 2 Each                 | 10 Each          | 016-1783-00                     |
| Spring Loaded Grounds               | 2 Each                 | 6 Each           | 016-1782-00                     |
| <b>New Products</b>                 |                        |                  |                                 |
| Probe Tip Connector Saver           | 2 Each                 | 2 Each           | 016-1781-00<br>(2 per package)  |
| IEEE 1394 Breakout Connector        | None                   | order separately | 679-5027-00                     |
| RAMBUS "Longhorn" Via Probe         | None                   | 5 Each           | 016-1780-00<br>(5 per package)  |

### INTERNATIONAL POWER PLUG OPTIONS

Opt. A1 – Europe Power Cord.

Opt. A2 – UK Power Cord.

Opt. A3 – Australia Power Cord.

Opt. A4 – Switzerland Power Cord.

Opt. A6 – Japanese Power Cord.

### For further information, contact Tektronix:

Worldwide Web: for the most up-to-date product information visit our web site at: [www.tektronix.com](http://www.tektronix.com)

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