

Z-Active™ Differential Probe Family

P7313 • P7380A • P7360A • P7340A Data Sheet



Features & Benefits

- Signal Fidelity
 - >12.5 GHz Bandwidth (P7313, Typical)
 - >8.0 GHz Bandwidth (P7380A, Typical)
 - >6.0 GHz Bandwidth (P7360A, Typical)
 - >4.0 GHz Bandwidth (P7340A, Typical)
- Extended Linear Dynamic Range
 - 1.25 V_{p-p} at 5x Attenuation (P7313)
 - 4 V_{p-p} at 25x Attenuation (P7313)
 - 2 V_{p-p} at 5x Attenuation (P7380A, P7360A, P7340A)
 - 5 V_{p-p} at 25x Attenuation (P7380A, P7360A, P7340A)
- Low Probe Loading
 - DC Input Resistance
 - 100 k Ω Differential
 - 50 k Ω Single Ended
 - AC Loading
 - Z_{min} >200 Ω out to 10 GHz (P7313)
 - Z_{min} >290 Ω , 4 GHz to 8 GHz (P7380A, P7360A, P7340A)
- Versatility
 - Make Differential or Single-ended (Ground-referenced) Measurements*1
 - Solder-down Capability
 - Handheld Probing with Variable Spacing and Compliance
 - Fixtured Probing
- Interchangeable Tip-Clip™ Assemblies
 - Connect to a Variety of Devices
 - Economical
- TekConnect® Interface

Applications

- Examples Include, but are not Limited To:
 - PCI-Express I and II, Serial ATA II, USB 2.0, DDRII, DDRIII, Firewire 1394b, Rambus, XAUI

*1 For details, please see application note 60W-18344-0, "Making Single-ended Measurements with Differential Probes."

Z-Active™ Probing Architecture Leads the Way for High-speed Probing Applications

Tektronix has created a revolutionary Z-Active probe architecture that sets the industry benchmark for signal fidelity. Tektronix active probe architecture preserves high bandwidth while providing improved connectivity with low loading. The Z-Active architecture is a hybrid approach composed of a distributed attenuator topology feeding an active probe amplifier.

The Z-Active probes use a tiny passive probe tip element that is separate from the amplifier, extending the usable reach of the probe. In traditional active probes, adding this much length can introduce signal fidelity problems. However this architecture maintains high DC input resistance and presents a higher AC impedance than previous probe architectures. It accomplishes this while providing significant length between the probe body and the probe attachment point to the DUT. This architecture provides the best of both worlds: high DC impedance like existing active probes and the stable high-frequency loading of Z_0 probes.

Signal Fidelity

You can be confident in the signal fidelity of your measurements because the Z-Active architecture provides:

- High Bandwidth
- Excellent Step Response
- Low Loading
- High CMRR
- Extended Linear Dynamic Range

Extended Linear Dynamic Range

Many of today's logic signals and serial bus signals require the capability to measure up to several volts peak to peak. These voltage levels may easily be viewed with the Z-Active architecture probes (P7380A, P7360A, and P7340A) with the extended linear dynamic range. With a $2.0 V_{p-p}$ linear dynamic input range at the 5x attenuation setting, you can accurately measure DDR II and III, Firewire 1394b, and PCI-Express I and II signals at reduced noise levels. In addition the 25x attenuation setting's linear dynamic input voltage range can be used up to $5.0 V_{p-p}$ for accessing even larger signal swings found during transition times.

Connectivity

The Z-Active probe design allows the probe to easily switch between soldered, handheld, or fixtured applications.

This family of probes uses Tip-Clip™ assemblies, an interchangeable probe tip system that enables customers to configure their probe with the optimal tip for their application. These detachable assemblies make it possible to replace a tip for a fraction of the cost formerly associated with such hardware changes. The several lengths and variable spacing of the assemblies provide flexibility for adapting to vias and other test points of differing sizes. With Tektronix Tip-Clip assemblies, Monday's solder-in probe can become Tuesday's handheld tool, simply by switching tips.

Value

The combination of the Z-Active architecture and the Tip-Clip assemblies provide superior signal fidelity at a cost-effective price. The inexpensive Tip-Clip assemblies enable full-performance solder connections at a very low price per connection. Over the life of a probe this can add up to significant savings in the cost of operation.

Characteristics

| Characteristic | P7340A | P7360A | P7380A | P7313 |
|--|---|---|---|--|
| Bandwidth (Typical) | >4 GHz | >6 GHz | >8 GHz | >12.5 GHz |
| Rise Time (10%-90%) (Guaranteed) | <100 ps | <70 ps | <55 ps | <40 ps |
| Rise Time (20%-80%) (Typical) | <70 ps | <50 ps | <35 ps | <25 ps |
| Attenuation | 5x or 25x, user selectable | | | |
| Differential Input Range | | ±1.0 V (5x) ±2.5 V (25x) | | ±0.625 V (5x) ±2.0 V (25x) |
| Linearity Error for Differential Input Dynamic Range (Typical) | | ±0.5% for -0.5 V to +0.5 V (5x) ±1.0% for -0.75 V to +0.75 V (5x) ±2.0% for -1.0 V to +1.0 V (5x) ±0.5% for -1.5 V to +1.5 V (25x) ±1.0% for -2.5 V to +2.5 V (25x) ±2.0% for -3.0 V to +3.0 V (25x) | | ±0.25% for -0.5 V to +0.5 V (5x) ±0.75% for -0.625 V to +0.625 V (5x) ±0.5% for -1.6 V to +1.6 V (25x) ±1.0% for -2.0 V to +2.0 V (25x) |
| Operating Voltage Window | | +5.0 V to -3.0 V | | +4.0 V to -3.0 V |
| Offset Voltage Range | | | +4.0 V to -3.0 V | |
| DC Input Resistance | | | 100 kΩ | |
| AC Loading (Differential Z _{min}) | | >290 Ω | | >200 Ω |
| Noise | | | <31 nV/√Hz (5x) <75 nV/√Hz (25x) | |
| CMRR | >50 dB at 1 MHz >35 dB at 1 GHz >20 dB at 4 GHz | >50 dB at 1 MHz >35 dB at 1 GHz >20 dB at 6 GHz | >50 dB at 1 MHz >35 dB at 1 GHz >20 dB at 8 GHz | >50 dB at 1 MHz >35 dB at 1 GHz >20 dB at 6 GHz >15 dB at 12.5 GHz |
| Nondestructive Input Range | | | ±15 V | |
| Interface | | | TekConnect® | |
| Cable Length | 1.5 m | 1.5 m | 1.2 m | 1.2 m |

Ordering Information

P7313

>12.5 GHz Z-Active Differential Probe for TekConnect® Interface.

Includes: See Standard Accessories table.

P7380A

>8.0 GHz Z-Active Differential Probe for TekConnect® Interface.

Includes: See Standard Accessories table.

P7360A

>6.0 GHz Z-Active Differential Probe for TekConnect® Interface.

Includes: See Standard Accessories table.

P7340A

>4.0 GHz Z-Active Differential Probe for TekConnect® Interface.

Includes: See Standard Accessories table.

Standard Accessories

| Description | P7340A | P7360A | P7380A | P7313 | Reorder Part Number |
|--|---------|---------|---------|---------|---|
| Pouch, Nylon Carrying Case with Inserts | 1 each | 1 each | 1 each | 1 each | 016-1952-xx Qty 1 |
| Accessory Performance Summary and Reorder Sheet | 1 each | 1 each | 1 each | 1 each | 001-1389-xx Qty 1 |
| User Manual - Printed. Includes Reply Card and CD | 1 each | 1 each | 1 each | 1 each | 020-2640-xx Qty 1 – Opt. L0 020-2648-xx Qty 1 – Opt. L5 040-2649-xx Qty 1 – Opt. L7 |
| BNC (M)-to-Minigrabber Adapter | 1 each | 1 each | 1 each | 1 each | 013-0342-xx Qty 1 |
| Anti-static Wrist Strap | 1 each | 1 each | 1 each | 1 each | 006-3415-xx Qty 1 |
| Magnifying Glasses | 1 each | 1 each | 1 each | 1 each | 378-0486-xx Qty 1 |
| Calibration Data Report | 1 each | 1 each | 1 each | 1 each | Opt. D1 |
| Handheld Probe Adapter | 1 each | 1 each | 1 each | 1 each | 015-0717-xx |
| Accessory Box and Contents | | | | 1 each | P7313: 020-2636-xx |
| | | | 1 each | | P7380A: 020-2557-xx |
| | | 1 each | | | P7360A: 020-2690-xx |
| | 1 each | | | | P7340A: 020-2690-xx |
| Attachment Kit | 1 each | 1 each | 1 each | 1 each | 016-1953-xx Qty 1 |
| Velcro Fastening Strap | 10 each | 10 each | 10 each | 10 each | – |
| Velcro Fastening Dots | 10 each | 10 each | 10 each | 10 each | – |
| Adhesive Tip-Clip Tape*2 (Strip of 10) | 3 each | 3 each | 3 each | 3 each | – |
| Color Band Kit (2 ea. of 5 colors) | 1 each | 1 each | 1 each | 1 each | 016-1948-xx Qty 1 |
| Short Flex, Small Resistor Tip-Clip Assembly | 2 each | 2 each | 3 each | 3 each | 020-2600-xx Qty 10 |
| Medium Flex, Small Resistor Tip-Clip Assembly | 2 each | 2 each | 3 each | 3 each | 020-2602-xx Qty 10 |
| Long Flex, Small Resistor Tip-Clip Assembly | 2 each | 2 each | 3 each | 3 each | 020-2604-xx Qty 10 |
| Variable Spacing Tip-Clip Kit | 3 each | 3 each | 3 each | 3 each | 020-2596-xx (Kit of 3) |
| Square Pin Adapter Tip-Clip | 1 each | 1 each | 1 each | 1 each | 020-2701-xx (Kit of 3) |
| Tip-Clip Ejector*2 | 3 each | 3 each | 3 each | 3 each | – |
| HBW Straight Flex Tip-Clip Assembly | – | – | – | 3 each | 020-2639-xx Qty 10 |
| | | | | | 020-2657-xx Qty 5 |
| | | | | | 020-2638-xx Qty 10 |
| HBW Right-Angle Flex Tip-Clip Assembly | – | – | – | 3 each | 020-2656-xx Qty 5 |
| | | | | | 020-2644-xx Qty 1 |
| Wire Replacement Kit | – | – | – | 1 each | 020-2644-xx Qty 1 |
| Short Flex, Large Resistor 1/8 W Tip-Clip Assembly | – | – | 3 each | – | 020-2601-xx Qty 10 |
| Long Flex, Large Resistor 1/8 W Tip-Clip Assembly | – | – | 3 each | – | 020-2605-xx Qty 10 |
| Medium Flex, Large Resistor 1/8 W Tip-Clip Assembly | 2 each | 2 each | 3 each | – | 020-2603-xx Qty 10 |

*2 Tip-Clip Ejectors and Tip-Clip Tape are shipped standard with the 020-xxxx-xx Tip-Clip Assembly Kits.

Recommended Accessories

| Description | P7360 | P7380 | P7313 | Part Number |
|--|-------|-------|-------|---------------------|
| Probe Positioner | Yes | Yes | Yes | PPM100 |
| Probe Positioner | Yes | Yes | Yes | PPM203B |
| PPM203B, PPM100 Adapter Fixture | Yes | Yes | Yes | 013-0339-xx |
| Calibration Fixture | Yes | Yes | Yes | P7340A: 067-0419-xx |
| | | | | P7360A: 067-0419-xx |
| | | | | P7380A: 067-0419-xx |
| | | | | P7313: 067-1616-xx |
| DSA8200 Series TekConnect® Probe Interface | Yes | Yes | Yes | 80A03 |
| Deskew Fixture | Yes | Yes | Yes | 067-1586-xx |
| Real-time Spectrum Analyzer TekConnect Probe Adapter | Yes | Yes | Yes | RTPA2A |

Service Options

- Opt. CA1 – A single calibration event or coverage for the designated calibration interval, whichever comes first.
- 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.
- Opt. R5 – Repair Service 5 Years.

Language Options

- Opt. L0 – English Manual.
- Opt. L5 – Japanese Manual.
- Opt. L7 – Simplified Chinese Manual.

Additional Service Products Available During Warranty (DW) or Post Warranty (PW)

- P7313-CA1 – A single calibration event or coverage for the designated calibration interval, whichever comes first
- P7313-R1PW – Repair service coverage 1 year post warranty
- P7313-R2PW – Repair service coverage 2 year post warranty
- P7313-R3DW – Repair service coverage 3 years (includes product warranty period); 3-year period starts at time of customer instrument purchase.
- P7313-R5DW – Repair service coverage 5 years (includes product warranty period); 5-year period starts at time of customer instrument purchase.
- P7340A-CA1 – A single calibration event or coverage for the designated calibration interval, whichever comes first
- P7340A-R1PW – Repair service coverage 1 year post warranty
- P7340A-R2PW – Repair service coverage 2 year post warranty
- P7340A-R3DW – Repair service coverage 3 years (includes product warranty period); 3-year period starts at time of customer instrument purchase.
- P7340A-R5DW – Repair service coverage 5 years (includes product warranty period); 5-year period starts at time of customer instrument purchase.
- P7360A-CA1 – A single calibration event or coverage for the designated calibration interval, whichever comes first
- P7360A-R1PW – Repair service coverage 1 year post warranty
- P7360A-R2PW – Repair service coverage 2 year post warranty
- P7360A-R3DW – Repair service coverage 3 years (includes product warranty period); 3-year period starts at time of customer instrument purchase.
- P7360A-R5DW – Repair service coverage 5 years (includes product warranty period); 5-year period starts at time of customer instrument purchase.
- P7380A-CA1 – A single calibration event or coverage for the designated calibration interval, whichever comes first
- P7380A-R1PW – Repair service coverage 1 year post warranty
- P7380A-R2PW – Repair service coverage 2 year post warranty
- P7380A-R3DW – Repair service coverage 3 years (includes product warranty period); 3-year period starts at time of customer instrument purchase.
- P7380A-R5DW – Repair service coverage 5 years (includes product warranty period); 5-year period starts at time of customer instrument purchase.



Product(s) are manufactured in ISO registered facilities.



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