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 kΩ Differential
    - 50 kΩ 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, Fireware 1394b, Rambus, XAUI

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

Tektronix®

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.

Performance You Can Count On

Depend on Tektronix to provide you with performance you can count on. In addition to industry-leading service and support, this product comes backed by a three-year warranty as standard.

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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.

P7380A
>8.0 GHz Z-Active Differential Probe for TekConnect® Interface.

P7360A
>6.0 GHz Z-Active Differential Probe for TekConnect® Interface.

P7340A
>4.0 GHz Z-Active Differential Probe for TekConnect® Interface.

All Include: Three-year warranty, plus see Standard Accessories table.

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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
HBW Right-Angle Flex Tip-Clip Assembly	−	−	−	3 each	020-2638-xx Qty 10
					020-2656-xx Qty 5
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 – Single Calibration or Functional Verification.

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. G3 – Complete Care 3 Years (includes loaner, scheduled calibration and more). P7360A, P7380A only

Opt. G5 – Complete Care 5 Years (includes loaner, scheduled calibration and more). P7360A, P7380A only

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 – Single Calibration or Functional Verification.

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 – Single Calibration or Functional Verification.

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 – Single Calibration or Functional Verification.

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 – Single Calibration or Functional Verification.

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.

CE

ISO 9001

Product(s) are manufactured in ISO registered facilities.

GPIB
IEEE-488

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

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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**

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