

Z-Active™ Differential Probe Family

P7313 • P7380A • P7360A • P7340A Datasheet



Key features

- 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

- MIPI® D-PHY/C-PHY, LPDDR2/3, PCI-Express, Serial ATA, USB

Z-Active probing architecture for high-speed probing applications

Tektronix created the Z-Active probe architecture and set the industry benchmark for signal fidelity. Tektronix active probe architecture preserves high bandwidth while providing improved connectivity with low loading and low noise. 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 other 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 Z0 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
- Low noise

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

- High CMRR
- Extended linear dynamic range

Low loading

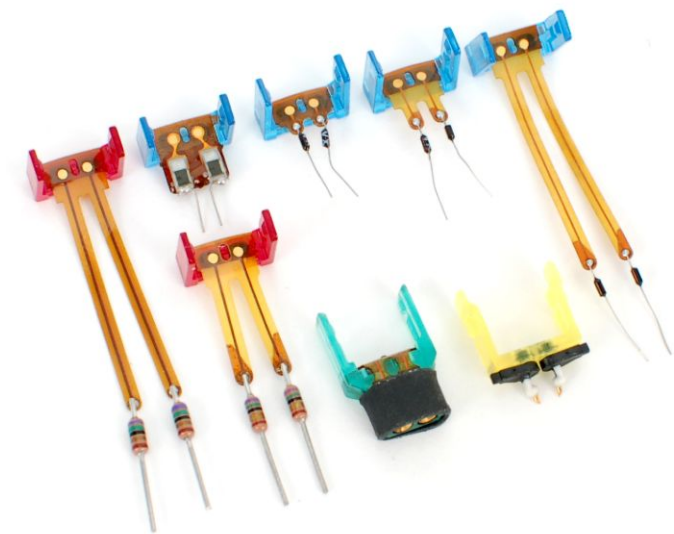
Circuits designed for low power consumption can operate in unterminated modes with high impedance. Probing these buses in low power mode requires a probe with high impedance at low and medium frequencies. The Z-Active probes provide high impedance inputs that minimize the probe's loading on low power circuits.

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 Vp-p linear dynamic input range at the 5x attenuation setting, you can accurately measure MIPI D-PHY and C-PHY, LPDDR2 and LPDDR3, and PCI-Express signals at reduced noise levels. In addition the 25x attenuation setting's linear dynamic input voltage range can be used up to 5.0 Vp-p for accessing even larger signal swings found during transition times.

Versatile 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 engineers 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. Tip-Clips are available in several lengths and with variable tip spacing to 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.



Tip-Clip assemblies



Quick Connect Flex Solder tips

The Quick Connect Flex Solder tips can bend in multiple axes allowing them to avoid obstacles on a circuit board, such as heat sinks, connectors, or tall components.

Handheld and fixtured probing needs are met using the Handheld Adapter and Variable Spacing Tip-Clips.



Handheld Adapter (HHA) accessory

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, with industry-leading service and support.

Specifications

All specifications apply to all models unless noted otherwise.

Model overview

	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
Operating temperature	–35 °C to 85 °C (–13 °F to 185 °F)			

Ordering information

Models

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 models include one-year warranty and standard accessories.

Standard accessories

Description	Quantity included with each probe	Reorder part number
Pouch, nylon carrying case with inserts	1 each	016-1952-xx qty 1
Accessory reorder list and summary	1 each	see www.tektronix.com for latest version
User manual - printed Includes reply card and CD	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	013-0342-xx qty 1
Anti-static wrist strap	1 each	006-3415-xx qty 1
Magnifying glasses	1 each	378-0486-xx qty 1
Calibration data report	1 each	Opt. D1
Handheld probe adapter	1 each	015-0717-xx
Accessory box and contents	1 each	P7313: 020-2636-xx
		P7380A: 020-2557-xx
		P7360A: 020-2690-xx
		P7340A: 020-2690-xx
Attachment kit	1 each; includes Velcro straps, dots, and Tip-Clip tape listed below	016-1953-xx qty 1
Velcro fastening strap	2 each	—
Velcro fastening dots	10 each	—
Adhesive Tip-Clip Tape ²	3 each (Strip of 10)	—
Color band kit	1 each (2 ea. of 5 colors)	016-1948-xx qty 1
Tip-Clip accessories:		
Short flex, small resistor Tip-Clip assembly	P7340A and P7360A: 2 each P7380A and P7313: 3 each	020-2600-xx qty 10
Medium flex, small resistor Tip-Clip assembly	P7340A and P7360A: 2 each P7380A and P7313: 3 each	020-2602-xx qty 10
Long flex, small resistor Tip-Clip assembly	P7340A and P7360A: 2 each P7380A and P7313: 3 each	020-2604-xx qty 10
Variable spacing Tip-Clip kit	3 each	020-2596-xx (kit of 3)
Square pin adapter Tip-Clip	1 each	020-2701-xx (kit of 3)
Tip-Clip ejector ²	3 each	—

² Tip-Clip ejectors and Tip-Clip tape are shipped standard with the 020-xxxx-xx Tip-Clip assembly kits.

Description	Quantity included with each probe	Reorder part number
HBW straight flex Tip-Clip assembly	P7313 only: 3 each	020-2639-xx qty 10 020-2657-xx qty 5
HBW Right-Angle flex Tip-Clip assembly	P7313 only: 3 each	020-2638-xx qty 10 020-2656-xx qty 5
Wire replacement kit	P7313 only: 1 each	020-2644-xx qty 1
Short flex, large resistor 1/8 w Tip-Clip assembly	P7380A only: 3 each	020-2601-xx qty 10
Long flex, large resistor 1/8 w Tip-Clip assembly	P7380A only: 3 each	020-2605-xx qty 10
Medium flex, large resistor 1/8 w Tip-Clip assembly	P7340A and P7360A: 2 each P7380A: 3 each	020-2603-xx qty 10
Quick Connect, Short Flex solder tip assembly	3 each	020-3148-xx
Quick Connect, Medium Flex solder tip assembly	3 each	020-3149-xx
Square Pin, Tip-Clip assembly for use with Quick Connect Flex solder tips	3 each	020-3150-xx

Recommended accessories

Quick Connect, Short Flex solder tip assembly for use with DRAM interposers	020-3147-xx (qty 3)
Medium Flex, Square Pin Tip-Clip assembly	020-3116-xx (qty 10)
Probe positioner	PPM100
Probe positioner	PPM203B
PPM203B, PPM100 adapter	013-0339-xx
Calibration fixtures	P7340A: 067-0419-xx, P7360A: 067-0419-xx, P7380A: 067-0419-xx, P7313: 067-1616-xx
Deskew fixture	067-1586-xx
DSA8300 Series TekConnect® Probe Interface	80A03
Real-time Spectrum Analyzer TekConnect probe adapter	RTPA2A

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. G3	Complete Care 3 Years (includes loaner, discount on scheduled calibration and more)
Opt. G5	Complete Care 5 Years (includes loaner, discount on scheduled calibration and more)
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)

P7313

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

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

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

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.



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) 2656 6688

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

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.

