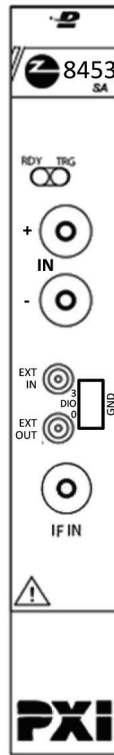


z8453
Signal Analyzer
PXle



Front Panel



Label	Type	Description
IN +,-	SMA	Differential baseband input
IF IN	SMA	Single-Ended IF input
EXT IN	SMB	External input for trigger or reference
EXT OUT	SMB	External output for trigger, reference or event
DIO ¹	Header, 8-pin	Digital input/output, 4-signal (e.g. MIPI, SPI, I2C)

¹ DIO connector available on product revision 1B and later.

Baseband Inputs

Differential Baseband Input Channel (IN+/-)

Specification	Value
Channel	One Differential Input, IN+/-
Input Impedance Single-ended Differential	50 Ω 100 Ω $\leq \pm 1\%$ accuracy
Input VSWR ** 10 kHz to 460 MHz 460 MHz to 1 GHz	$\leq 1.9:1$ (R.L. < -10dB) Typical $\leq 3.5:1$ (R.L. < -5dB) Typical
Input Bias Current**	$\leq \pm 10 \mu\text{A}$
Connectors	SMA
Absolute Maximum Input (no damage) Single-ended	-2 V to +5 V (DC + peak AC), CAT I
Input Voltage Range	+4 dBm (1 Vppd)
Input Voltage Range Accuracy (500 MHz)	$\leq +0.1 / -0.3$ dB at 25 °C ambient $\leq \pm 0.03$ dB drift per °C
Input Offset Adjustment	No adjust
Analog Bandwidth -3 dB Bandwidth Stopband Rejection	10 kHz to 1 GHz ≥ 80 dB at 2 GHz
Passband Flatness 10 kHz to 50 MHz 10 MHz to 800 MHz 10 kHz to 1.015 GHz	+0.2 / -0.2 dB +0.5 / -1.0 dB +0.5 / -3.0 dB

Single-Ended IF Auxiliary Input Channel (IF IN)

Specification	Value
Channel	One Single-Ended Input, IF IN
Input Impedance	50 Ω $\leq \pm 1\%$ accuracy
Input VSWR ** 20 MHz to 575 MHz 575 MHz to 1 GHz	$\leq 1.9:1$ (R.L. < -10 dB) Typical $\leq 1.44:1$ (R.L. < -15 dB) Typical
Input Bias Current**	$\leq \pm 1$ nA (AC coupled)
Connectors	SMA
Absolute Maximum Input (no damage)	± 2 V (DC + peak AC), CAT I
Input Voltage Range	+4 dBm (1 Vppd)

Input Voltage Range Accuracy (500 MHz)	$\leq +0.1 / -0.3$ dB at 25 °C ambient $\leq \pm 0.03$ dB drift per °C
Analog Bandwidth -3 dB Bandwidth Stopband Rejection	10 MHz to 1 GHz ≥ 80 dB at 2 GHz
Passband Flatness 40 MHz to 50 MHz 40 MHz to 750 MHz 40 to 1.015 GHz	+0.25 / -1.0 dB +0.75 / -1.4 dB +0.75 / -3.0 dB

Input Dynamic Performance (IN+/- and IF IN)

Specification	Value
Spurious-Free Dynamic Range (Excluding harmonics) (Tested at 10.7, 60.1 and 250MHz)	≥ 73 dBc Typical
Harmonic Distortion	≥ 74 dBc at 250 MHz
Intermodulation Distortion (2 tone, 20 ± 1 , 251 ± 1 , 500 ± 1 , 750 ± 1 , & 1000 ± 1 MHz)	≥ 73 dBc Typical
Average Noise Density IN +/- IF	≤ -138 dBm/Hz ≤ -143 dBm/Hz
Phase Noise (187.5 MHz, typical) 1 kHz offset frequency 10 kHz offset frequency 100 kHz offset frequency 1 MHz offset frequency 10 MHz offset frequency	-115 dBc/Hz -134 dBc/Hz -139 dBc/Hz -139 dBc/Hz -140 dBc/Hz

Timebase Reference

Specification	Value
Timebase Reference	10 MHz or 100 MHz
Timebase Reference Source	Internal TCXO, External Input, Backplane CLK10 or CLK100 (PXIe)
Internal TCXO Timebase	± 2.5 ppm accuracy
Timebase Output	External Output

Analog-to-Digital Converter (ADC) & Digital Downconverter (DDC)

Specification	Value
ADC Vertical Resolution	12 Bits 0.024% of full-scale range
ADC Clock Frequency	2.5 GS/s sampling
ADC Clock Jitter **	≤ 150 fs RMS
I/Q Data Vertical Resolution ²	up to 32 bits 16-bit and 32-bit data formats
I/Q Data Rate (flexible data rate with fractional resampling)	123 S/s to 312.5 MS/s, 612.5 MS/s, & 1.25 GS/s 2.5 GS/s (DDC Bypass) 1 Hz resolution
I/Q Data Memory	512 MiByte total
I/Q Waveform Size (matched I/Q sizes)	up to 128 MiSamples (16-bit data) up to 64 MiSamples (32-bit data for ≤312.5MS/s sample rate)
Input Channel Mode (DDC input feed)	RF input Baseband IN+/- input IF IN input
Baseband/IF Instantaneous Bandwidth (alias-free)	81.25% of sample rate (DDC enabled) 1.015 GHz, 507 MHz, or 253 MHz to 100 Hz, 1 Hz resolution
Baseband/IF Resolution Bandwidth	1 Hz to 3 MHz 0.1 Hz resolution
Baseband/IF Center Frequency	0 Hz to 1.25 GHz 1 Hz resolution

WLAN Modulation Analysis

IEEE 802.11a/g/n/ac OFDM

Residual EVM (Typical), with 540 MHz center frequency on VSA/VSG

Modulation Bandwidth	IF/IN Input: IF/IN Input Reference Level: -24 dBm to +3 dBm (Peak)	
	+3 dBm (Peak)	-24 dBm (Peak)
20 MHz	-57 dB (0.14%)	-36 dB (1.6%)
40 MHz	-52 dB (0.25%)	-32.5 dB (2.4%)
80 MHz	-50 dB (0.32%)	-30 dB (3.2%)
160 MHz	-47 dB (0.45%)	-27 dB (4.5%)

² DDC filtering of quantization noise adds to vertical resolution by $10 \cdot \log_{10}(\text{OSR})$, where OSR is the oversampling ratio. For example, DDC filtering from 2.5 GS/s to 625 MS/s provides $10 \cdot \log_{10}(2500/625)=6$ dB, or 1 bit additional resolution

Center Frequency Tracking

Specification	Value
Frequency Range	± 625 kHz
Frequency Error	± 10 Hz + (reference accuracy X center frequency)

Trigger

Specification	Value
Trigger Source	I, Q, Envelope, External Input, DIO, Pattern, Software, Immediate (no trigger), TTL Trigger 0-7, Star Trigger
Trigger Slope/Polarity	Positive or Negative
Trigger Position	Pre-Trigger & Post-Trigger
Trigger Jitter	≤ 2.5 ns peak-to-peak
Trigger Resolution	Signal Triggers: Minimum 3.2ns @ $F_{\text{SAMPLE}} \geq 312.5$ MHz, else $1/(F_{\text{SAMPLE}})$
Trigger Hysteresis (time)	Defines trigger hold-off time 0 to 209 μ s
Trigger Hysteresis (amplitude)	Trigger hysteresis in percentage or volts

External Input (front panel)

Specification	Value
Functionality	Trigger Input, Timebase Reference Input
Absolute Maximum Input (no damage)	$\leq \pm 5$ V (DC + peak AC), CAT I
Input Trigger Level Adjustment	-2 V to +2 V 0.5 mV resolution ≤ 20 mV accuracy 20 mV overdrive (input hysteresis)
Input Bandwidth (-3 dB)	≥ 250 MHz
Input Impedance	$1 \text{ M}\Omega \parallel 30 \text{ pF}$ or 50Ω $\leq \pm 2\%$ accuracy
Connector	SMB

External Output (front panel)

Specification	Value
Functionality	Trigger Output, Timebase Reference Output, Event Output, Programmable Clock Output, Programmable Pulse Output, Constant Level
Output Event Source	Trigger Event, Capture Complete Event, Operation Complete Event, Master Summary Status Event
Polarity	High or Low Truth
Programmable Event Pulse Width	50 ns to 163 ms
Programmable Clock	Period: 26.667 ns to 100 seconds 26.667 ns resolution 50% Duty Cycle
Programmable Pulse Pulse Repetition Interval Pulse Width	26.667 ns to 100 seconds, 26.667 ns resolution 13.333 ns
Probe Compensation	10 kHz Clock which can be used to compensate probes
Limit Test Successful	Event pulse after each capture upon limit or mask test success
Output Level	Programmable Level: Default: +3.3 V into open load Open load: 0 to +5 V 50 Ω load: 0 to +4.1 V Level accuracy: $\pm 5\%$ Output Drive: $\geq \pm 90$ mA
Output Enable	Tri-State Output Capability
Current Sense	± 90 mA current sense range Triggered or immediate capture 0.1 mA resolution
Connector	SMB

Digital Input/Output (DIO) Front Panel³

Specification	Value
Functionality	4-bit bi-directional Digital I/O software programmable. Future serial interfaces such as MIPI, SPI, I ² C, etc
Programmable Clock Rate	Up to 50 MHz
Programmable Logic	≥ 5 ns resolution
Programmable Direction	Input (52 k Ω pull-up) or Output
Programmable Source/Destination	Backplane triggers, external in/out, trigger event

³ DIO connector available on product revision 1B and later.

Output Level	Programmable Level: Default: +1.2 V into open load Range: +1.2 V to +3.6 V into open load Level accuracy: $\pm 5\%$ Output Drive: $\geq \pm 20$ mA
Output Enable	Tri-State Output Capability
Connector	8-pin Latching Header

Backplane Trigger

Specification	Value
Functionality	Multi-Instrument Synchronization Trigger, Event Output Signals
Triggers	TTL Trigger 0-7
Direction	Input or Output
Source	Trigger Event, Capture Complete Event, Operation Complete Event, Master Summary Status Event, Constant Level
Polarity	High or Low Truth
Programmable Event Pulse Width	50 ns to 163 ms

Traces

Specification	Value
Trace Channels	Quantity 8
Trace Size	Up to 512 KiSample 32-bit floating point data
Trace Feed (source)	Input Channels or Reference Channels
Trace Type	Write (Live), Average, Max Hold, Min Hold (Reference Feeds use Write Type only)
Trace Average Count	2 to 65535
Trace Data Format	Linear Magnitude, Logarithmic Magnitude, Phase, Real, Imaginary, 32-bit floating point data

Reference Waveforms

Specification	Value
Reference Channels	Quantity 4
Reference Storage	Non-volatile memory storage
Reference Data	32 KiSample maximum waveform size 32-bit floating point data
Reference Data Format	Linear Magnitude, Logarithmic Magnitude, Phase, Real, Imaginary, 32-bit floating point data

Markers

Specification	Value
Marker Channels	Quantity 2
Marker Functionality	Waveform Trace Magnitude and Frequency Markers
Marker Source	Trace 1-8
Marker Peak Search Search Methods Selectable Search Options	Maximum, Next Maximum by Amplitude, Next Maximum Left, Next Maximum Right Absolute Threshold, Relative Excursion

Data Processing & Download

Specification	Value
Self-Calibration	Automatic internal calibration: spur cancellation
Waveform Data Formats	16-bit or 32-bit signed integer (I/Q time-domain data) 32-bit floating point (Trace or Reference data) Intel or Motorola Byte Order

Instrument Stored States

Specification	Value
Functionality	Non-volatile storage of instrument setup configuration
Stored States	30 State 0 is Reset State Power-On State programmable

Status Reporting

Specification	Value
IEEE-488.2 Device Status	Reporting Structure including Status Byte, Standard Event Registers, Questionable Registers, Operation Registers and Self-Test Status Registers

LED Indicators

Specification	Value
RDY (Ready)	OFF: Hardware Failure ON: Unit has passed power-up self-diagnostics TOGGLE: Unit has an error pending in error queue
TRG (Trigger)	OFF: Trigger event not detected ON/PULSE: Trigger complete event detected TOGGLE: Device identify enabled

PXIe Interface

Specification	Value
PXIe Slot Compatibility	PXI Standard Slot and PXIe Hybrid Slot Compatible
PXI Timing & Triggering Signals (XJ4 Connector)	PXI_TRIG[0:7] input/output PXI_STAR input PXI_CLK10 input
PXIe Timing & Triggering Signals (XJ3 Connector)	PXI_DSTARA input (unused) PXI_STAR input PXI_CLK10 input

Power & Cooling

Power Supplies

Model	Platform	Voltage	Typical Current	Maximum Current
z8453	PXIe	+3.3 VDC +12 VDC	0.93 A 2.10 A	0.98 A 2.26 A

Total Cooling & Power Consumption

Model	Platform	Typical Cooling & Power	Maximum Cooling & Power
z8453	PXIe	25.2 W	30.3 W

Notes: Self-protect thermal shutdown will activate at ~50°C. Reset of instrument required to recover from thermal shutdown. Recommend use of slot blockers in chassis for empty slots. Units tested in zSeries 9-slot and 18-slot chassis.

Physical & Environmental

Size & Weight

Specification	Value
Physical size	Single-Wide 3U PXIe Instrument 8.25" x 0.79" x 5.25" (L x W x H) 20.96 cm x 2.01 cm x 13.34 cm (L x W x H)
Weight	11.9 oz or 337 g

Temperature Range

Specification	Value
Operating	0°C to +40°C ambient (MIL-PRF28800F Class 3)
Storage	-40°C to +75°C (MIL-PRF28800F Class 3)
Over-Temperature	Automatic shutdown if internal temperature exceeds +50°C
Calibration Range	+20°C to +30°C ambient, after a 20 minute warm-up period, to meet all calibration specification accuracies

Relative Humidity

Specification	Value
Operating or Storage Up to +30°C +30°C to +40°C above +40 °C	5 to 95% ± 5% non-condensing, 5 to 75% ± 5% non-condensing, 5 to 45% ± 5% non-condensing

Altitude

Specification	Value
Operating	Up to 5 km
Storage	Up to 15 km

Additional Resources

LitePoint zSeries offers several hardware and software resources. Please visit the website www.litepoint.com for the latest information and versions. Detailed information is also available in the individual manuals. Resources include: zSignal soft front panels, instrument drivers, cables and probes.

Methodology

All Specifications describe the performance at an ambient temperature of 20-25° C unless otherwise noted.

All Specifications are Factory tested to verify performance meets the specified limits, except those marked with (**) which are guaranteed by design, or those marked as Typical.

Specifications marked as Typical indicate that 80% of the units tested fall within the limits.

Terminology

Numeric Prefixes

When referring to numeric values, this document will use SI (International System of Units) and IEC (International Electrotechnical Commission) standard prefixes. Prefix definitions are in the following table.

Prefix	Multiplier
n (nano)	1/(1000x1000x1000)
μ (micro)	1/(1000x1000)
m (milli)	1/1000
k/K (kilo)	1000
M (Mega)	1000x1000
G (Giga)	1000x1000x1000
Ki (Kibi)	1024
Mi (Mebi)	1024x1024
Gi (Gibi)	1024x1024x1024

Differential Outputs

Single-Ended is used to refer to the output on either the + or – output pin

Differential is used to refer to the output between the + and- output pins

Vd indicates Volts differential

Vppd indicates Volts peak-to-peak differential

Safety

This product is designed to meet the requirements of the following standard of safety for electrical equipment for measurement, control and laboratory use: EN 61010-1

Electromagnetic Compatibility

CE Marking EN 61326-1:1997 with A1:1998 and A2:2001 Compliant

FCC Part 15 (Class A) Compliant

Emissions

EN 55011	Radiated Emissions, ISM Group 1, Class A, distance 10 m, emissions < 1 GHz
EN 55011	Conducted Emissions, Class A, emissions < 30 MHz Immunity
EN 61000-4-2	Electrostatic Discharge (ESD), 4 kV by Contact, 8 kV by Air
EN 61000-4-3	RF Radiated Susceptibility, 10 V/m
EN 61000-4-4	Electrical Fast Transient Burst (EFTB), 2 kV AC Power Lines
EN 61000-4-5	Surge
EN 61000-4-6	Conducted Immunity
EN 61000-4-8	Power Frequency Magnetic Field, 30 A/m
EN 61000-4-11	Voltage Dips and Interrupts

CE Compliance

This product meets the necessary requirements of applicable European Directives for CE Marking as follows:

73/23/EEC Low Voltage Directive (Safety)

89/336/EEC Electromagnetic Compatibility Directive (EMC)

See Declaration of Conformity for this product for additional regulatory compliance information.

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