# SDS1000X SDS1000X+ Series Digital Oscilloscope





SIGLENT TECHNOLOGIES CO.,LTD

## SDS1102X SDS1202X SDS1102X+ SDS1202X+

#### **Overview**

SIGLENT's new SDS1000X/SDS1000X+ Series Super Phosphor Oscilloscopes are available in two bandwidths, 100 MHz and 200 MHz, have a sampling rate of 1 GSa/s and a standard record length of 14 Mpts. The most commonly used functions can be accessed with its user-friendly one-button design.

The SDS1000X/SDS1000X+ series employs a new generation of SPO technology. With its excellent signal fidelity, background noise is lower than similar products in the industry. It has a minimum vertical input range of 500 uV/div, an innovative digital trigger system with high sensitivity and low jitter, and a waveform capture rate of 60,000 frames/sec. It also employs not only the common 256-level intensity grading display function but also a color temperature display mode not found in other models in this class. Siglent's new oscilloscopes offering supports multiple powerful triggering modes including serial bus triggering and decoding. History waveform recording and sequential triggering allow for extended waveform records to be captured, stored, and analyzed. SDS1000X+ adds an integrated 25 MHz arbitrary waveform generator (standard), option for 16 digital channels. The features and high-performance of the SDS1000X/SDS1000X+ oscilloscopes cannot be matched else anywhere at this price.



#### **Key Features**

- 🚣 200 MHz, 100 MHz bandwidth models
- Real-time sampling rate up to 1 GSa/s
- New generation of SPO technology
  - Waveform capture rate up to 60,000 wfm/s (normal mode), and 400,000 wfm/s (sequence mode)
  - Supports 256-level intensity grading and color temperature display
  - Record length up to 14 Mpts
  - Digital trigger system
- Intelligent trigger: Edge, Slope, Pulse Width, Window, Runt, Interval, Time out (Dropout), Pattern
- Serial bus triggering and decode, supports protocols IIC, SPI, UART, RS232, CAN, LIN
- 🜆 Video trigger, supports HDTV
- Low background noise, supports 500µV / div to 10V / div voltage scales
- 10 types of one-button shortcuts, supports Auto Setup, Default, Cursors, Measure, Roll, History, Display/Persist, Clear Sweep, Zoom and Print
- Segmented acquisition (Sequence) mode, dividing the maximum record length into multiple segments (up to 80,000), according to trigger conditions set by the user, with a very small dead time segment to capture the qualifying event.
- History waveform record (History) function, the maximum recorded waveform length is 80,000 frames.
- Automatic measurement function on 37 parameters, supports Statistics, Gating measurement, Math measurement, History measurement and Ref measurement
- Math function (FFT, addition, subtraction, multiplication, division, integration, differential, square root)
- IIII High Speed hardware based Pass/ Fail function
- I6 Digital channels (MSO), Maximum waveform capture rate up to 500 MSa/s, Record length up to 14 Mpt/CH (Option for SDS1000X+ models)
- 25 MHz DDS arbitrary waveform generator, built-in 10 kinds of waveforms (Standard for SDS1000X+ models)
- Large 8 inch TFT-LCD display with 800 \* 480 resolution
- Abundant interfaces: USB Host, USB Device (USB-TMC), LAN (VXI-11), Pass / Fail, Trigger Out
- Supports SCPI remote control commands

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### **Models and Key Specifications**

Model	SDS1102X SDS1102X+	SDS1202X SDS1202X+
Bandwidth	100 MHz	200 MHz
Sampling Rate (Max.)	1 GSa/s	
Channels	2+EXT	
Memory Depth (Max.)	7 Mpts/CH (Dual-Channel); 14 Mpts/CH (Single-Channel)	
Waveform Capture Rate (Max.)	60,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)	
Trigger Type	Edge, Slope, Pulse width, Window, Runt, Interval, Dropout, Pattern, Video	
Serial Trigger	I <sup>2</sup> C, SPI, UART/RS232, CAN, LIN	
Decode Type (Optional)	I <sup>2</sup> C, SPI, UART/RS232, CAN, LIN	
DDS Waveform Generator	Single Channel, Max. Frequency up to 25 MHz, 125 MSa/s sampling	rate, 16 Kpts wave length
	SDS1000X+ Supported (Standard); SDS1000X Not supported	
16 Digital Channels (MSO	Maximum waveform capture rate up to 500 MSa/s, Record length u	p to 14 Mpts/CH
Option)	SDS1000X+ Supported (Optional); SDS1000X Not supported	
Logic Probe	SPL1016 (Optional)	
I/O	USB Host, USB Device, LAN, Pass/Fail, Trigger Out, 1 KHz Cal	
Probe (Std)	2 pcs passive probe PP510	2 pcs passive probe PP215
Display	8 inch TFT-LCD (800x480)	
Weight	Without package 3.26 Kg; with package 4.25 Kg	

## **Function & Characteristics**

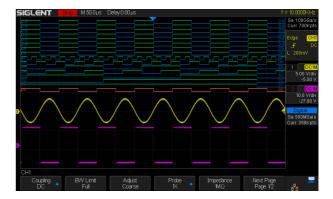
#### 8 inch TFT-LCD display and 10 one-button menus



8-inch TFT-LCD display with 800 \* 480 resolution

Most commonly used functions are accessible using 10 different one-button operation keys: Auto Setup, Default, Cursor, Measure, Roll, History, Persist, Clear Sweep, Zoom, Print

#### 16 Digital Channels/MSO (Optional for SDS1000X+)



2 analog channels plus 16 digital channels enables users to acquire and trigger on the waveforms then analyze the pattern, simultaneously with one instrument.

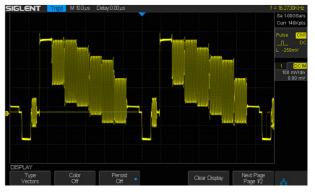
#### Characteristics

Waveform capture rate up to 400,000 wfms/s

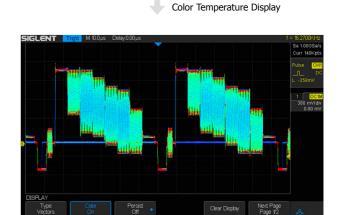


With a waveform capture rate of up to 400,000 wfm/s (sequence mode), the oscilloscope can easily capture the unusual or low-probability events.

256 intensity grading and color temperature display



SPO display technology provides for fast refresh rates. The resulting intensity-graded trace is brighter for more often-occurring display points and dimmer in less-often-occurring points

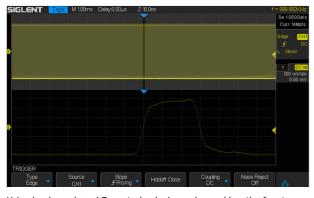


The color temperature display is similar to the intensity-graded trace except that the trace occurrence is represented by different colors (color "temperature") as opposed to changes in the intensity of one color. Red represents the most common occurrences or probabilities while blue is the least common points.



SDS1000X/SDS1000X+ displays the decoding through the events list. Bus protocol information can be quickly and intuitively displayed in table form.

#### Record length of up to 14 Mpts



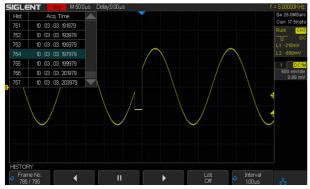
Using hardware-based Zoom technologies and record length of up to 14 Mpts, users are able to use a higher sampling rate to capture more of the signal, and then quickly zoom in to focus on the area of interest

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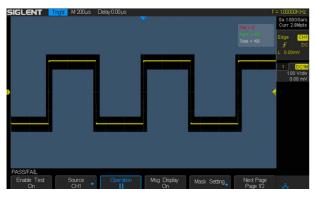
SDS1000X/SDS1000X+ has a wealth of trigger modes, including Edge, Slope, Pulse, Video, Windows, Runt, Interval, Time out (Dropout), Pattern, IIC, SPI, UART/RS232, LIN, CAN

#### History Waveforms (History) mode and segmented acquisition (Sequence)



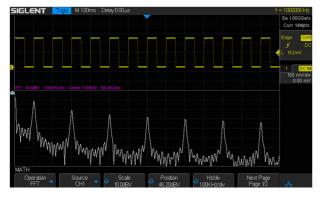
Playback history waveform to observe unusual events and locate the source quickly through the cursor or measurements, located on the keyboard Panel, this function is easily enabled. Segmented memory collection will store the waveform into multiple (up to 80,000) memory segments, each segment will store a triggered waveform and dead time information

#### Hardware-Based High Speed Pass/Fail Function



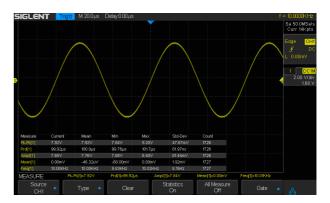
The SDS1000X/SDS1000X+ utilizes a hardware-based Pass / Fail function, performing up to 40,000 Pass / Fail decisions each second. With easy to generate user-defined test templates, the SDS1000X/SDS1000X+ compares the current measured trace to the template mask trace making it suitable for long-term signal monitoring or automated production line testing.

#### Advanced Math Function



In addition to the traditional (+, -, X, /) operation, SDS1000X/ SDS1000X+ oscilloscopes supports FFT, integration, differentiation, and square root operations.

#### Comprehensive statistical functions



Parametric statistical functions to display any parameters of the five measurements: current, average, minimum value, maximum value, and the standard deviation. The measurement count is also displayed. The maximum number of parameters that can be measured and simultaneously analyzed statistically is five. Supports Gating measurements, Math measurement, History measurement, Ref measurement.

#### Built-in 25 MHz function/arbitrary waveform generator (Standard for SDS1000X+ Models)



The SDS1000X+ has a built-in 25 MHz function / arbitrary waveform generator (standard), including 10 built-in waveforms plus 4 ARBs. The arbitrary waveforms can be accessed and edited by the EasyWave PC software

#### Complete connectivity



SDS1000X/SDS1000X+ supports USB Host, USB Device (USB-TMC), LAN(VXI-11), Pass/Fail and Trigger Out

## Specifications

Acquire System		
Sampling Rate	1 GSa/s (Single-Channel), 500 MSa/s (Daul-Channel)	
Memory Depth	Max 14 Mpts/Ch (Single-Channel), 7 Mpts/Ch (Dual- Channel)	
Peak Detect	1 ns	
Average	Averages: 4,16, 32,64,128,256,512,1024	
Eres	Enhance bits: 0.5, 1, 1.5, 2, 2.5, 3 Selectable	
Waveform interpolation	Sinx/x, Linear	

Input		
Channel	2	
Coupling	DC, AC, GND	
Impodance	DC: (1 MΩ±2%)    (18 pF ±2 pF)	
Impedance	50 Ω: 50 Ω±2%	
Max Input voltage	1 MΩ ≤400 Vpk(DC + Peak AC <=10 kHz),	
Max Input Voltage	50 Ω ≤5 Vrms	
CH to CH Isolation	DC~Max BW >40 dB	
Probe attenuator	1 X, 10 X, 50 X, 100 X, 500 X , 1000 X	

Vertical System	
Pandwidth (2 dP)	200 MHz (SDS1202X/SDS1202X+) 100 MHz (SDS1102X/SDS1102X+)
Vertical Resolution	8 bit
Vertical Scale (Probe 1X)	500 µV/div - 10 V/div (1-2-5 )
Offset Range (Probe 1X)	500 μV ~ 150 mV: ± 1 V 152 mV ~ 1.5 V: ± 10 V 1.52 V ~ 10 V: ± 100 V
Bandwidth Limit	20 MHz ±40%
	DC ~ 10%(BW): ± 1 dB 10% ~ 50%(BW): ± 2 dB 50% ~ 100%(BW): + 2 dB / -3 dB
Low Frequency Response (AC-3 dB)	≤10 Hz (at input BNC)
NUISE	ST-DEV ≤0.7 division (<1 mV/div) ST-DEV ≤0.3 division(<2 mV/div) ST-DEV ≤0.2 division(≥2 mV/div)
SFDR including harmonics	≥35 dB
DC Gain Accuracy	≤±3.0%: 5 mV/div ~10 V/div ≤±4.0%: ≤2 mV/div
Offset Accuracy	±(1%* Offset+1.5%*8*div+2 mV): ≥2 mV/div ±(1%* Offset+1.5%*8*div+500 uV): ≤1 mv/div
	Typical 1.8 ns (SDS1202X/SDS1202X+) Typical 3.5 ns (SDS1102X/SDS1102X+)
Overshoot (500 ps Pulse)	<10%

Horizontal System	
Time base Scale	2.0 ns/div ~ 50 s/div
Channel Skew	<100 ps
Waveform Capture Rate	Up to 60,000 wfm/s (normal mode), 400,000 wfm/s (sequence mode)
Intensity grading	256 Levels
Display Format	Y-T, X-Y, Roll
Time base Accuracy	±25 ppm
Roll Mode	50 ms/div ~ 50 s/div (1-2-5 step)

Trigger System	
Trigger Mode	Auto, Normal, Single
	Internal: ±4.5 div from the center of the screen
Trigger Level	EXT: ±0.6 V
	EXT/5: ±3 V
Hold-off Range	80 ns ~ 1.5 s
Trigger Coupling	AC , DC, LFRJ, HFRJ , Noise RJ (CH1~CH2)
	DC: Passes all components of the signal
Coupling Frequency Decouped	AC: Blocks DC components and attenuates signals below 5.8 Hz
Coupling Frequency Response (CH1~CH2)	LFRJ: Blocks the DC component and attenuates the low-frequency components below 2 MHz
	HFRJ: Attenuates the high-frequency components above 1.27 MHz
	DC: Passes all components of the signal
Coupling Frequency Response	AC: Blocks DC components and attenuates signals below 30 Hz
(EXT)	LFRJ: Blocks the DC component and attenuates the low-frequency components below 300 Hz
. ,	HFRJ: Attenuates the high-frequency components above 7 MHz
Trigger Accuracy (Typical)	Internal: ±0.2 div EXT: ±0.4 div
Trigger Sensitivity	CH1~CH2: DC~ Max BW 0.6 div EXT: 200 mVpp DC ~ 10 MHz 300 mVpp 10 MHz ~ BW frequency EXT/5: 1 Vpp DC ~ 10 MHz 1.5 Vpp 10 MHz ~ BW frequency
Trigger Jitter	<100 ps (CH1~CH2)
Trigger Displacement	Pre-Trigger: 0~100% Memory Delay Trigger: 0 to 10,000 div

Slope Trigger	
Slope	Rising, Falling
Limit Range	<, >, <>, ><
Source	CH1/CH2
Time Range	2 ns ~ 4.2 s
Resolution	1 ns
Edge Trigger	
Slope	Rising, Falling, Rising & Falling
Source	CH1/CH2 /EXT/(EXT/5)/AC Line
Pulse Trigger	
Polarity	+wid , -wid
Limit Range	<, >, <>, ><
Source	CH1/CH2
Pulse Range	2 ns ~ 4.2 s
Resolution	1 ns
Video Trigger	
Signal Standard	NTSC, PAL, 720p/50, 720p/60, 1080p/50, 1080p/60, 1080i/50,
Source	1080i/60, Custom
Source	CH1/CH2
Sync	Any, Select
Trigger condition	Line, Field
Interval Trigge	r
Slope	Rising, Falling
Limit Range	<, >, <>, ><
Source	CH1/CH2

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Time Range

Resolution

2 ns ~ 4.2 s

1 ns

SDS1000X/SDS1000X+ Digital Oscilloscope

Dropout Trigger	
Time out Type	Edge, State
Source	CH1/CH2
Slope	Rising, Falling
Time Range	2 ns ~ 4.2 s
Resolution	1 ns

Runt Trigger		
Polarity	+wid , -wid	
Limit Range	<, >, <>, ><	
Source	CH1/CH2	
Time Range	2 ns ~ 4.2 s	
Resolution	1 ns	
Pattern Trigger		
Pattern Setting	Invalid, Low, High	
Logic	AND, OR, NAND, NOR	
Source	CH1/CH2	
Limit Range	<, >, <>, ><	
Time Range	2 ns ~ 4.2 s	
Resolution	1 ns	
Window Trigger		

## Window TypeAbsolute, RelativeSourceCH1/CH2

Serial Trigger	
I <sup>2</sup> C Trigger	
Condition	Start, Stop, Restart, No Ack, EEPROM, 7 bits Address & Data, 10 bits Adress & Data, Data Length
Source (SDA/SCL)	CH1, CH2
Data format	Hex
Limit Range	EEPROM: =, >, <
Data Length	EEPROM: 1 byte
	Addr & Data: 1~2 byte
	Data Length: 1~12 byte
R/W bit	Addr & Data: Read, Write, Do not care

SDI Triggor	
SPI Trigger	
Condition	Data
Source (CS/CL/Data)	CH1, CH2
Data format	Binary
Data Length	4 ~ 96 bit
Bit Value	0, 1, X
Bit Order	LSB, MSB
UART/ RS232 T	rigger
Condition	Start, Stop, Data, Parity Error
Source (RX/TX)	CH1, CH2
Data format	Hex
Limit Range	=, >, <
Data Length	1 byte
Data Width	5 bit, 6 bit, 7 bit, 8 bit
Parity Check	None, Odd, Even
Stop Bit	1 bit, 1.5 bit, 2 bit
Idle Level	High, Low
Baud (Selectable)	600/1200/2400/4800/9600/19200/38400/57600/115200 bit/s
(Custom)	300 bit/s ~ 334000 bit/s

CAN Trigger	
Condition	All, Remote, ID, ID + Data, Error
Source	CH1,CH2
ID	STD (11 bit), EXT (29 bit)
Data Format	Hex
Data Length	1~2 byte
Baud Rate (Selectable)	5k/10k/20k/50k/100k/125k/250k/500k/800k/1M bit/s
Baud Rate (Custom)	5 kbit/s~1 Mbit/s
LIN Trigger	
Condition	Break, Frame ID, ID+Data, Error
Source	CH1, CH2
ID	1 byte
Data Format	Hex
Data Length	1~2 byte
Baud Rate (Selectable)	600/1200/2400/4800/9600/19200 bit/s
Baud Rate (Custom)	300 bit/s~20 kbit/s

Serial Decoder (	(Optional)
I <sup>2</sup> C Decoder	
Signal	SCL, SDA
Address	7bit, 10 bit
Threshold	-4.5~4.5 div
List	1~7 lines
SPI Decoder	
Signal	SCL, MISO, MOSI, CS
Edge Select	Rising, Falling
Idle	Low, High
Bit Order	MSB, LSB
Threshold	-4.5~4.5 div
List	1~7 lines
UART/ RS232 D	ecoder
Signal	RX, TX
Data Width	5 bit, 6 bit, 7 bit, 8 bit
Parity Check	None, Odd, Even
Stop Bit	1 bit, 1.5 bit, 2 bit
Idle Level	Low, High
Threshold	-4.5~4.5 div
List	1~7 lines
CAN Decoder	
Signal	CAN_H, CAN_L
Source	CAN_H, CAN_L, CAN_H-CAN_L
Threshold	-4.5~4.5 div
List	1 ~ 7 lines
LIN Decoder	
LIN Specification Package Revision	Ver1.3, Ver2.0
Threshold	-4.5 ~ 4.5 div
List	1 ~ 7 lines

Same Minder of Measurement Range         Oppose Twestwents at the same time Measurement Range         Sequencies the same time Measurement Range           Measurement Range         Secret region           Measurement Range         Main         Malent entropic week week measurement Range           Main         Difference between maximum and minimum data values           Main         Value of most probabile linker state in a bimodal weedom           Main         Value of most probabile linker state in a bimodal weedom           Main         Nate of deviation of al data values           Main         Standard deviation of al data values           Main         Standard deviation of al data values           Main         Standard deviation of al data values           Main         Row may supper of al data values           Main         Overshoot after a railing edge(max-top)/amplitude           Main         Main         Main           Main         Main         Main           Main         Main         Main           Main         Main         Main           Main	Measure System			
MeasurementsSearcher regionMeasurements areSearcher regionMeasurements areUser studie in input wordernMinCovers tudie in input wordernPicPeDifference between top and base in a bimodal signal, or between max and min in an unincedal signalPicPeWale of most probable higher state in a bimodal signal, or between max and min in an unincedal signalPicPeValue of most probable higher state in a bimodal signal, or between max and min in an unincedal signalPicPeValue of most probable higher state in a bimodal wavefornMeanAverage of data valuesConsonAverage of data valuesConsonSandard deviation of all data valuesPicPeOvershoot before a failing edge;(fasc-min)/AmplitudeConsonSondard sandard valuesPicPeOvershoot before a rating edge;(fasc-min)/AmplitudeRiPeOvershoot before a rating edge;(fasc-min)/AmplitudeRiPeNeirod for every cycle in worderom at the 50% level, and positive slopeRiPeNeirod for every cycle in worderom at the 50% level, and positive slopeRiPeNeirod for every cycle in worderom at the 50% level, and positive slopeRiPeNeirod for every cycle in worderom at the 50% level, and positive slopeRiPeNeirod for fring edge for the fast failing edge or then fast failing edge or the fast failin	Source	CH1, CH2, Math, Ref, History		
Heatsurement Powers voise in liquit value in input value/orm           Min         Lowest value in input value/orm           Min         Difference between maximum and minimum data values           Ampl         Difference between maximum and minimum data values           Ampl         Difference between top and base in a bimodal value/orm           Top         Value of most probable higher state in a bimodal value/orm           Base         Value of most probable higher state in a bimodal value/orm           Mean         Average of data values           Cmean         Average of data values           Standard deviation of all data values in the first cycle         Standard deviation of all data values in the first cycle           CMM         Root mean square of all data values in the first cycle           FVV         Overshoot after a falling edge(chase-top)/Amplitude           ROV         Overshoot before a rising edge(max-top)/Amplitude           ROV         Overshoot before a rising edge(max-top)/Amplitude           ROV         Overshoot before a rising edge(max-top)/Amplitude           ROV         Overshoot after a lating edge (tase value)           ROV         Overshoot after a lating edge (tase value)           ROV         Overshoot after a lating edge(tase top)/Amplitude           ROV         Overshoot after a rising edge(rase top)/Amplitude		Display 5 measurements at the same time		
Vertical (Voltage)         Max         Highest value in input waveform           Nerke         Difference between maximum and minimum data values           Ampl         Difference between maximum and minimum data values           Rev (M)         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Base         Value of most probable lingher state in a bimodal waveform           Construct bottom of all data values         The first cycle           State         State value of all data values           Construct bottom a rating dage:(base-min)/Amplitude         Construct bottom a rating dage:(base-min)/Amplitude           PRE         Overshout bottom a rating dage:(base-min)/Amplitude           PRE         Overshout bottom a rating dage:(base-min)/Amplitude           PRE         Overshout bottom a rating dage:(base-min)/Amplitude           PRE         Previd of revery cycle in waveform at th	Measurement Range Screen region, Gate region			
Min         Lowest value in input waveform           Pick         Difference between top and hase in a bimodel signal, or between max and min in a unimodel signal           Top         Value of most probable higher state in a bimodel signal, or between max and min in a unimodel signal           Top         Value of most probable higher state in a bimodel signal, or between max and min in a unimodel signal           Top         Value of most probable higher state in a bimodel signal, or between max and min in a unimodel signal           Min         Average of all data values           Casta         Standard deviation of all data values in the first cycle           Casta         Standard deviation of all data values in the first cycle           Row mean square of all data values in the first cycle         Standard deviation of all data values in the first cycle           RoW         Overshoot date a falling edge;(fusa-min)/Anplitude           ROW         Overshoot date a sing edge(fusa-min)/Anplitude           ROW         Overshoot date a sing edge(fusa-min)/Anplitude           Level3X         Hord sone for sing edge form 10:90%           Nota         Freque         Freque on for inder cycle in waveform at the 50% level and positive slope           Value         Andre of failing edge; form 10:90%         Standard deviation edge form 10:90%           Nota         Inform the first sing edges of thenstot failing edge or then first failing edge or then	Measurement Paran	neters (37 Typ	es)	
Pic?k         Ofference between top and base in a binned signal, or between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in an unimodal signal, and between max and min in anunin an unimax and max and max and max and min in the unimodal sig	Vertical (Voltage <b>)</b>	Max	Highest value in input waveform	
Anj         Ofference between top and base in a bimodal signal, or between max and min in an unimodal signal           Fig         Value of most probable lively state in a bimodal waveform           Base         Value of most probable lively state in a bimodal waveform           Mand         Average of data values           Crean         Average of data values in the first cycle           Stade         Stader deviation of all data values           Crean         Root mean square of all data values           Root         Vershot before a ralling edge;(tass-min)/Amplitude           Root         Newstop state state all bas values           Root         Newstop state state all bas values           Hale         Newstop state state state stabis objeophanoit data sequet		Min	Lowest value in input waveform	
Fig.         Value of most probable higher state in a bimodal waveform           Fig.         Value of most probable higher state in a bimodal waveform           Mean         Average of data values           Carl         Average of data values           Carl         Standard deviation of all data values           Carl         Overshot after a falling edge;(max-top)/Amplitude           Fig.         Overshot after a rising edge;(max-top)/Amplitude           RPRE         Overshot after a rising edge;(max-top)/Amplitude           RPRE         Vershot after a rising edge; form stop is belowel, and positive slope           Inter         Numeasured at 50% level and positive slope           Value         Mide measured at 50% level and positive slope           Value         Numeasured at 50% level and positive slope           Value         Numeasured at 50% level and positive slope		Pk-Pk	Difference between maximum and minimum data values	
Base         Value of most probable lower state in a bimodal waveform           Mano         Average of al data values           Cinean         Average of al data values           Stade         Stadard deviation of all data values           Stade         Stadard deviation of all data values           Cinean         Roader deviation of all data values           Views         Noreshot before a fining dege(max-top)/mplitude           Roader         Viewshot before a fining dege(max-top)/Mplitude           Roader         Preventor before all ning dege(max-top)/Mplitude           Roader         Preventor before all ning dege (max-top)/Mplitude           News         Preventor before all ning dege (max-top)/wplitude           News         Preventor before all ning dege (max-top)/wplitude           News         Noreson of sing dege (max-top)/wplitude           News         Noreson of sing dege (max-top)/wplitude           Noreson the first sing dege of tha		Ampl		
Name         Average of ald ada values           Name         Average of data values in the first cycle           Standar deviation of all data values         Standard deviation of all data values           Name         Standard deviation of all data values in the first cycle           VIMS         Root mean square of all data values in the first cycle           FOW         Overshoot after a falling edge;(tase-min)/Amplitude           FOW         Overshoot after a falling edge;(tase-min)/Amplitude           FOW         Overshoot before a falling edge;(tase-min)/Amplitude           ROW         Overshoot before a falling edge;(tase-min)/Amplitude           New FoW         New FoW FoW FoW FoW FoW FoW           New FoW         New FoW				
Ream         Average of data values in the first cycle           Refer         Standral deviation of all data values           Stadval         Standral deviation of all data values           VEX         Root mean square of all data values in the first cycle           VEX         Root mean square of all data values in the first cycle           FOX         Root mean square of all data values in the first cycle           FOX         Overshoot after a falling edge(max-top)/Amplitude           RPRE         Overshoot after a sing edge(max-top)/Amplitude           RPRE         Overshoot after a sing edge(max-top)/Amplitude           RPRE         Overshoot after a sing edge(max-top)/Amplitude           RPRE         Revershoot before a ning edge(max-top)/Amplitude           RPRE         Revershoot before a ning edge(max-top)/Amplitude           RPRE         Revershoot before a ning edge(max-top)/Amplitude           RPRE         Revershoot before and thing edge(max-top)/Amplitude           RPRE         Revershoot before and thing edge(max-top)/Amplitude           RPRE         Revershoot before and thing edge form applice           RPRE         Revershoot before and thing edge form applice           RPRE         Revershoot before and thing edge form applice           RPRE         Revershoot before and thing edge of channel A tot the first falling edge of channel A, tot the			·	
Stave         Standar deviation of all data values           Field         Standar deviation of all data values in the first cycle           Standar deviation of all data values in the first cycle         Root mean square of all data values in the first cycle           Field         Root mean square of all data values in the first cycle           Field         Root mean square of all data values in the first cycle           Field         Root mean square of all data values in the first cycle           Field         Overshoot after a filing edge;(face-min)/Amplitude           Root         Overshoot after a filing edge;(face-min)/Amplitude           Root         New foot all the rising edge;(face-min)/Amplitude           Root         Pershoot before a nising edge;(face-min)/Amplitude           Root         New foot every cycle in waveform at the 50% level, and positive slope           Field         Neuton of rising edge from 50% level, and positive slope           Field         Neuton of rising edge from 50%           Root         Neuton of rising edge of thanel A tot the first failing edge of chanel A tot the first faili			-	
Edd         Standard deviation of all data values in the first cycle           VRMS         Root mean square of all data values           FOR         Root mean square of all data values in the first cycle           FOR         Overshoot before a failing edge;(base-min)/Amplitude           ROV         Overshoot before a frising edge;(max-top)/Amplitude           ROV         Overshoot before a frising edge;(base-min)/Amplitude           Verelox 1         the voltage value of the trigger point           Verelox 1         Torque cycle in waveform at the 50% level, and positive slope           FOR         Vidth measured at 50% level and positive slope           FOR         Vidth measured at 50% level and positive slope           FOR         Vidth measured at 50% level and positive slope           FOR         Vidth measured at 50% level and positive slope           FOR         Vidto failing edge from 0-90%           FOR         Roit of positive width to period           FOR         Roit of positive width to period           FOR         Tore from the first frising edge of channel A, tothe first failing edge of channel B			-	
VRMS         Rot mean square of all data values           Cms         Rot mean square of all data values in the first cycle           PCV         Overshoot after a failing edge;(base-min)/Amplitude           FRV         Overshoot after a rising edge;(max-top)/Amplitude           RPRE         Overshoot before a rising edge;(base-min)/Amplitude           Leval9X         Period         Networds the trigger point           RPRE         Overshoot before a rising edge;(base-min)/Amplitude         Period           Vershoot before a rising edge;(base-min)/Amplitude         Period         Networds the trigger point           Networds         Period         Networds the trigger point         Period           Networds         Period         Networds the trigger point         Period         Networds the trigger point           Networds         Networds of the every cycle in waveform at the 50% level and positive slope         Period         Networds the every cycle in waveform at the 50% level and positive slope           Not         Nation of rising edge from 10-09%         Networds the first rising edge of the last rising edge of the period         Period         Networds the period           Point         Nation of rising edge of the period         Networds the rising edge of the period         Networds the period           Point         Net fore mot the first rising edge of thannel A to the first failing edge				
Rms         Root mean square of all data values in the first cycle           FV         Overshoot after a falling edge;(max-top)/Amplitude           FVE         Overshoot after a rising edge;(max-top)/Amplitude           RRE         Overshoot after a rising edge;(max-top)/Amplitude           RPRE         Overshoot after a rising edge;(max-top)/Amplitude           RPRE         Period         Period erising edge;(max-top)/Amplitude           Northoot after a rising edge;(max-top)/Amplitude         Period         Period           Precion         Period for every cycle in waveform at the 50% level, and positive slope         Period           Vidt measured at 50% level and negative slope         Vidt measured at 50% level and positive slope         Vidt measured at 50% level and positive slope           Vidt measured at 50% level and negative slope         Vidt measured at 50% level and negative slope         Vidt measured at 50% level and negative slope           Vidt measured at 50% level and negative slope         Vidt measured at 50% level and negative slope         Vidt Period           Vidt measured at 50% level and negative slope         Vidt measured at 50% level and negative slope         Vidt Period           Vidt measured at 50% level and negative slope         Vidt measured at 50% level and negative slope         Vidt Period           Vidt measured at 50% level and negative slope         Vidt negative slope         Vidt Period         Vid				
F0V         Overshoot after a failing edge;(base-min)/Amplitude           FNEE         Overshoot before a failing edge;(max-top)/Amplitude           R0V         Overshoot before a rising edge;(max-top)/Amplitude           R0E         Overshoot before a rising edge;(base-min)/Amplitude           FNEE         Period Period a rising edge;(base-min)/Amplitude           Frequency         Prove overshoot before a rising edge;(base-min)/Amplitude           Frequency         Prove overshoot before a rising edge;(base-min)/Amplitude           Frequency         Prove overshoot before a rising edge;(base-min)/Amplitude           Frequency         Proventy cycle in waveform at the 50% level, and positive slope           Frequency         Provency cycle in waveform at the 50% level, and positive slope           Frequency         Width measured at 50% level and negative slope           Frequency         Width measured at 50% level and negative slope           Frequency         Overshoot of failing edge (rom 10-90%           Frequency         Riso of nogative width to period           Polute         Riso of nogative width to period           Polute         Riso of nogative width to period           Polute         Riso of nogative width to period           Frequency         Riso on the first failing edge of channel A, to the first failing edge of channel A is the first failing edge of channel A is the first fail				
FRE         Overshoot before a failing edge;(max-top)/Amplitude           ROV         Overshoot after a rising edge;(max-top)/Amplitude           RVRE         Overshoot after a rising edge;(base-min)/Amplitude           Level@X         the voltage value of the trigger point           Horizontal (Time)         Period         Period for every cycle in waveform at the 50% level, and positive slope           +Wid         Width measured at 50% level and negative slope				
ROV         Overshoot after a rising edge; (max-top)/Amplitude           RPRE         Overshoot before a rising edge; (base-min)/Amplitude           Level@X         the voltage value of the trigger point           Horizontal (Time)         Period         Period for every cycle in waveform at the 50% level, and positive slope           FVMI         Width measured at 50% level and positive slope         Period           HWI         Width measured at 50% level and negative slope         Period           Rise Time         Duration of rising edge from 10-90%         Period           Rise Time         Duration of rising edge from 90-10%         Period           Baid         Time from the first rising edge ton 90-10%         Period           PubL         Ratio of positive width to period         PubL           PubL         Ratio of positive width to period         PubL           PubL         Ratio of neigger of each transition at a specific level and slope, include:: Current, Max, Min, Mean, Std-dev           Delay         Time from the first rising edge of channel A, to the first falling edge of channel A, to the first rising edge of channel A is the first rising edge of channel B           FRF         Time from the first rising edge of channel A, to the first falling edge of channel B           FRF         Time from the first rising edge of channel A, to the first falling edge of channel B           FRF				
LevelQXHevolage value of the trigger pointHorizontal (TIMP)PeriodPeriod or every cycle in waveform at the 50% level, and positive slopeFreqFequency for every cycle in waveform at the 50% level, and positive slope+WiduWidth measured at 50% level and negative slope+WiduWidth measured at 50% level and negative slopeFileDuration of rising edge from 10-90%Raise TimeDuration of falling edge from 90-10%BwiduTime from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossingPoluceRais of negative width to periodDelayTime from the first rising edges of the toos falling edge of channel 8, too falling edges of the toos crossingFRRCalculate the plaase difference between two edgesFRRTime from the first rising edges of than 4, to the first falling edge of channel 8FRRTime from the first rising edges of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first falling edge of channel 8FRRTime from the first rising edge of channel A, to the first fallin				
Horizontal (Time)         Period         Period for every cycle in waveform at the 50% level , and positive slope           Freq         Frequency for every cycle in waveform at the 50% level , and positive slope           +Wid         Width measured at 50% level and positive slope           -Wid         Width measured at 50% level and negative slope           -Wid         Width measured at 50% level and negative slope           -Wid         Width measured at 50% level and negative slope           -Wid         Duration of rising edge from 10-90%           Fall Time         Duration of filing edge from 90-10%           Bwid         Time from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossing           -Dut         Ratio of negative width to period           Delay         Time from the trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev           Delay         Time from the first rising edge of channel A, to the first falling edge of channel B           FFR         Time from the first rising edge of channel A, to the first falling edge of channel B           FFR         Time from the first falling edge of channel A, to the first falling edge of channel B           FFR         Time from the first falling edge of channel A, to the first falling edge of channel B           FFR         Time from the first falling edge of channel A, to the first fall		RPRE	Overshoot before a rising edge;(base-min)/Amplitude	
Freq         Frequency for every cycle in waveform at the 50% level, and positive slope           +Wid         Width measured at 50% level and positive slope           +Wid         Width measured at 50% level and negative slope           -Wid         Width measured at 50% level and negative slope           -Wid         Width measured at 50% level and negative slope           -Wid         Duration of rising edge from 10-90%           Fall Time         Duration of falling edge from 90-10%           Bwid         Time from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossing           +Dut         Ratio of negative width to period           -Dut         Ratio of negative width to period           Delay         Time from the trigger to the first transition at the 50% crossing           Time@Level         Time from trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev           Delay         Phase         Calculate the phase difference between two edges           FRR         Time from the first rising edge of channel A, to the first falling edge of channel B           FFF         Time from the first falling edge of channel A, to the first falling edge of channel B           FFR         Time from the first falling edge of channel A, to the first falling edge of channel B           FFR         Time from the first falling		Level@X	the voltage value of the trigger point	
+WidWidth measured at 50% level and positive slopeWidWidth measured at 50% level and negative slopeRise TimeDuration of rising edge from 10-90%Fall TimeDuration of falling edge from 90-10%BwidTime from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossing+DutRatio of positive width to period-DutRatio of negative width to periodDelayTime from the trigger to the first transition at the 50% crossingTime@LevelTime from thrigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-devDelayFRRCalculate the phase difference between two edgesFRRTime from the first rising edge of channel A, to the first falling edge of channel BFFFTime from the first rising edge of channel A, to the first falling edge of channel BFFRTime from the first rising edge of channel A, to the first fining edge of channel BFFFTime from the first rising edge of channel A, to the first fining edge of channel BFFFTime from the first rising edge of channel A, to the first fining edge of channel BFFFTime from the first rising edge of channel A, to the first fining edge of channel BLFFTime from the first rising edge of channel A, to the first fining edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel B<	Horizontal (Time)	Period	Period for every cycle in waveform at the 50% level ,and positive slope	
WideWide measured at 50% level and negative slopeRise TimeDuation of rising edge from 10-90%Fall TimeDuation of falling edge from 90-10%BwideTime from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossingPuteRatio of positive width to periodDutationTime from the trigger to the first transition at the 50% crossingPuteTime from the trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-devPlaseCalculate the phase difference between two edgesRFRTime from the first rising edge of channel A, to the first falling edge of channel BFIFTime from the first falling edge of channel A, to the first falling edge of channel BRFRTime from the first rising edge of channel A, to the first falling edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the first rising edge of channel A, to the last rising edge of channel BRFRTime from the f		Freq	Frequency for every cycle in waveform at the 50% level ,and positive slope	
Rise Time         Duration of rising edge from 10-90%           Fall Time         Duration of falling edge from 90-10%           Bwid         Time from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossing           +Dut         Ratio of positive width to period           -Dut         Ratio of negative width to period           Delay         Time from the trigger to the first transition at the 50% crossing           Time@Level         Time from trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev           Delay         Phase         Calculate the phase difference between two edges           FRR         Time from the first rising edge of channel A, to the first falling edge of channel B           FRF         Time from the first rising edge of channel A, to the first falling edge of channel B           FFF         Time from the first rising edge of channel A, to the first falling edge of channel B           FFF         Time from the first falling edge of channel A, to the last rising edge of channel B           LRR         Time from the first rising edge of channel A, to the last rising edge of channel B           LRF         Time from the first rising edge of channel A, to the last rising edge of channel B           LRF         Time from the first rising edge of channel A, to the last rising edge of channel B           LRF         Time from the fi		+Wid	Width measured at 50% level and positive slope	
Fail Time         Duration of falling edge from 90-10%           Bwid         Time from the first rising edge to the last falling edge, or the first falling edge to the last rising edge at the 50% crossing           +Dut         Ratio of positive width to period           Delay         Time from the trigger to the first transition at the 50% crossing           Time@Level         Time from the trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev           Delay         Phase         Calculate the phase difference between two edges           FRR         Time from the first rising edge of channel A, to the first falling edge of channel B           FFR         Time from the first falling edge of channel A, to the first falling edge of channel B           FFR         Time from the first rising edge of channel A, to the first falling edge of channel B           FFF         Time from the first rising edge of channel A, to the first falling edge of channel B           FFF         Time from the first falling edge of channel A, to the first falling edge of channel B           LIR         Time from the first falling edge of channel A, to the last falling edge of channel B           LIF         Time from the first falling edge of channel A, to the last falling edge of channel B           LIF         Time from the first falling edge of channel A, to the last falling edge of channel B           LIF         Time from the first falling edge of channel A, to th		-Wid	Width measured at 50% level and negative slope	
BwidTime from the first rising edge to the last falling edge ,or the first falling edge to the last rising edge at the 50% crossing +DutAtio of positive width to period-DutRatio of negative width to periodDelayTime from the trigger to the first transition at the 50% crossingTime@LevelTime from the trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-devDelayPhaseCalculate the phase difference between two edgesFRRTime between the first rising edge of thannel A, to the first falling edge of channel BFFRTime from the first rising edge of channel A, to the first rising edge of channel BFFRTime from the first falling edge of channel A, to the first falling edge of channel BFFRTime from the first rising edge of channel A, to the first falling edge of channel BIRRTime from the first rising edge of channel A, to the last rising edge of channel BIRRTime from the first rising edge of channel A, to the last rising edge of channel BIRRTime from the first rising edge of channel A, to the last rising edge of channel BIRFTime from the first rising edge of channel A, to the last rising edge of channel BIRFTime from the first rising edge of channel A, to the last rising edge of channel BIRFTime from the first rising edge of channel A, to the last rising edge of channel BIRFTime from the first rising edge of channel A, to the last rising edge of channel BIRFTime from the first rising edge of channel A, to the last rising edge of channel BIRFTime from the first rising edge of channe		Rise Time	Duration of rising edge from 10-90%	
+Dut         Ratio of positive width to period           -Dut         Ratio of negative width to period           Delay         Time from the trigger to the first transition at the 50% crossing           Time@Level         Time from trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev           Delay         Phase         Calculate the phase difference between two edges           FRR         Time from the first rising edges of the two channels           FRF         Time from the first falling edge of channel A, to the first falling edge of channel B           FFF         Time from the first rising edge of channel A, to the last falling edge of channel B           LRR         Time from the first rising edge of channel A, to the last falling edge of channel B           LRF         Time from the first rising edge of channel A, to the last falling edge of channel B           LRF         Time from the first rising edge of channel A, to the last falling edge of channel B           Cursors         Manual : Time X1, X2, (X1-X2), (1/AT)           Voltage Y1, Y2, (Y1-Y2)         Track: Time X3, X2, (X1-X2)		Fall Time	Duration of falling edge from 90-10%	
PutRatio of negative width to periodPelayFime from the trigger to the first transition at the 50% crossingTime@LevelTime from trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-devPelayPhaseCalculate the phase difference between two edgesFRRTime from the first rising edges of the two channelsFRFTime from the first rising edge of channel A, to the first falling edge of channel BFFRTime from the first falling edge of channel A, to the first falling edge of channel BFFRTime from the first rising edge of channel A, to the first falling edge of channel BFFFTime from the first rising edge of channel A, to the last rising edge of channel BLRRTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BCurrsorsManual : Time Y, X2, (X1-X2), (1/AT) Voltage Y1, Y2, V(1-Y2) Track: Time X , X(1-X2), V(1-Y2) Track: X2, X(1-X2)StatisticsCurrent, Mean, Std-Dev, Count		Bwid	Time from the first rising edge to the last falling edge ,or the first falling edge to the last rising edge at the 50% crossing	
Delay         Time from the trigger to the first transition at the 50% crossing           Time@Level         Time from trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev           Delay         Phase         Calculate the phase difference between two edges           FRR         Time between the first rising edges of the two channels           FRF         Time from the first rising edge of channel A , to the first rising edge of channel B           FFR         Time from the first falling edge of channel A, to the first falling edge of channel B           FFR         Time from the first rising edge of channel A, to the first falling edge of channel B           FFR         Time from the first rising edge of channel A, to the last rising edge of channel B           FFR         Time from the first rising edge of channel A, to the last rising edge of channel B           LRR         Time from the first rising edge of channel A, to the last rising edge of channel B           LFF         Time from the first falling edge of channel A, to the last rising edge of channel B           Currsors         Manual: Time Trom the first falling edge of channel A, to the last rising edge of channel B           Currsors         Manual: Time Trom the first falling edge of channel A, to the last rising edge of channel B           Statistics         Current, Max, Std-Dev, Count		+Dut	Ratio of positive width to period	
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DelayPhaseCalculate the phase difference between two edgesFRRTime between the first rising edges of the two channelsFRFTime from the first rising edge of channel A, to the first falling edge of channel BFFRTime from the first falling edge of channel A, to the first rising edge of channel BFFFTime from the first falling edge of channel A, to the first falling edge of channel BLRRTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BLFFTime from the first rising edge of channel A, to the last rising edge of channel BCursorsManual : Time X1, X2, (X1-X2), (1/AT) Voltage Y1, Y2, (Y1-Y2) Track: Time X1, X2, (X1-X2), CountStatisticsCurrent, Mean, Std-Dev, Count		Delay	Time from the trigger to the first transition at the 50% crossing	
FRR       Time between the first rising edges of the two channels         FRF       Time from the first rising edge of channel A, to the first falling edge of channel B         FFR       Time from the first falling edge of channel A, to the first rising edge of channel B         FFF       Time from the first falling edge of channel A, to the first falling edge of channel B         LRR       Time from the first rising edge of channel A, to the last rising edge of channel B         LFF       Time from the first rising edge of channel A, to the last rising edge of channel B         Cursors       Manual : Time X1, X2, (X1-X2), (1/ΔT)         Voltage Y1, Y2, V1-Y2)       Time X1, X2, (X1-X2), (1/ΔT)         Statistics       Current, Mex, Std-Dev, Count		Time@Level	Time from trigger of each transition at a specific level and slope, include: Current, Max, Min, Mean, Std-dev	
FRF       Time from the first rising edge of channel A ,to the first falling edge of channel B         FFR       Time from the first falling edge of channel A ,to the first rising edge of channel B         FFF       Time from the first falling edge of channel A ,to the first falling edge of channel B         LRR       Time from the first rising edge of channel A ,to the last rising edge of channel B         LRF       Time from the first rising edge of channel A ,to the last falling edge of channel B         LFF       Time from the first rising edge of channel A ,to the last falling edge of channel B         Cursors       Manual : Time X1, X2, (X1-X2), (1/AT)         Yoltage Y1, Y2, (Y1-Y2)       Time X1, X2, (X1-X2), (1/AT)         Statistics       Current, Meax, Std-Dev, Count	Delay	Phase	Calculate the phase difference between two edges	
FFR       Time from the first falling edge of channel A , to the first rising edge of channel B         FFF       Time from the first falling edge of channel A , to the first falling edge of channel B         LRR       Time from the first rising edge of channel A , to the last rising edge of channel B         LRF       Time from the first rising edge of channel A , to the last rising edge of channel B         LFF       Time from the first falling edge of channel A , to the last rising edge of channel B         Cursors       Manual : Time XI, X2, (X1-X2), (1/AT)         Voltage Y1, Y2, (Y1-Y2)       Track: Time XI, X2, (X1-X2), (1/AT)         Track: Time XI, X2, (X1-X2), Count       Current, Max, Std-Dev, Count		FRR	Time between the first rising edges of the two channels	
FFF       Time from the first falling edge of channel A ,to the first falling edge of channel B         LRR       Time from the first rising edge of channel A ,to the last rising edge of channel B         LRF       Time from the first rising edge of channel A ,to the last falling edge of channel B         LFF       Time from the first falling edge of channel A ,to the last rising edge of channel B         Cursors       Manual : Time X1, X2, (X1-X2), (1/ΔT)         Yoltage Y1, Y2, (Y1-Y2)       Track: Time X1, X2, (X1-X2), (1/ΔT)         Statistics       Current, Mear, Std-Dev, Count		FRF	Time from the first rising edge of channel A ,to the first falling edge of channel B	
LRR       Time from the first rising edge of channel A, to the last rising edge of channel B         LRF       Time from the first rising edge of channel A, to the last falling edge of channel B         LFF       Time from the first falling edge of channel A, to the last rising edge of channel B         Cursors       Manual : Time X1, X2, (X1-X2), (1/ΔT)         Yoltage Y1, Y2, (Y1-Y2)       Track: Time X1, X2, (X1-X2), (1/ΔT)         Statistics       Current, Mear, Std-Dev, Count		FFR	Time from the first falling edge of channel A ,to the first rising edge of channel B	
LRF     Time from the first rising edge of channel A ,to the last falling edge of channel B       LFF     Time from the first falling edge of channel A ,to the last rising edge of channel B       Cursors     Manual : Time X1, X2, (X1-X2), (1/ΔT)       Yoltage Y1, Y2, (Y1-Y2)     Track: Time X1, X2, (X1-X2)       Statistics     Current, Mean, Std-Dev, Count				
LFF     Time from the first falling edge of channel A ,to the last rising edge of channel B       Cursors     Manual : Time X1, X2, (X1-X2), (1/ΔT) Voltage Y1, Y2, (Y1-Y2) Track: Time X1, X2, (X1-X2)       Statistics     Current, Mean, Std-Dev, Count				
Cursors     Manual : Time X1, X2, (X1-X2), (1/ΔT) Voltage Y1, Y2, (Y1-Y2) Track: Time X1, X2, (X1-X2)       Statistics     Current, Mean, Min, Max, Std-Dev, Count				
Statistics Current, Mean, Min, Max, Std-Dev, Count	Cursors	Manual : Time X1, X2, (X1-X2), (1/ΔT) Voltage Y1, Y2, (Y1-Y2)		
	Statistics			
	Counter			

Math Function	
Operation	+, -, *, /, FFT, d/dt,∫dt,√
FFT window	Rectangular, Blackman, Hanning, Hamming
FFT display	Full Screen, Split
Decoding number	2
SDS1000X+)	n Generator (Standard for
Channel	1
Max. Output Frequency	25 MHz
Sampling Rate	125 MSa/s
Frequency Resolution	1 μHz
Frequency Accuracy	±50 ppm
Vertical Resolution	14 bits
Amplitude Range	-1.5 ~ +1.5 V ( 50 Ω)
	-3 ~ +3 V (High-Z)
Waveform Type	Sine, Square, Ramp, Pulse, DC, Noise, Cardiac, Gaus Pulse, Exp Rise, Exp Fall, Arb
Output impedance	50 Ω±2%
Protection	Short-Circuit Protection
Sine	
Frequency	1 μHz ~ 25 MHz
Offset Accuracy (100 KHz)	±(0.3 dB*Offset Setting Value +1 mVpp)
Amplitude flatness (100 kHz, 5Vpp)	±0.3 dB
SFDR	DC ~ 1 MHz -60 dBc
	1 MHz ~ 5 MHz -55 dBc
	5 MHz ~ 25 MHz -50 dBc
HD	DC-5 MHz -50 dBc
HD	DC-5 MHz -50 dBc 5 MHz - 25 MHz -45 dBc
Square/Pulse	5 MHz - 25 MHz -45 dBc
Square/Pulse Frequency	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz
Square/Pulse Frequency Duty Cycle	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80%
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz,	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical)	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3%
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3%
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100%
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical)	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry)
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical) Symmetry	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100%
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical)	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable)
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical) Symmetry	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry)
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical) Symmetry DC	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable) ±1.5 V (50 Ω)
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical) Symmetry DC Offset range	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% (Adjustable) ±1.5 V (50 Ω) ±3 V (High-Z)
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical) Symmetry DC Offset range Accuracy	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% (Adjustable) ±1.5 V (50 Ω) ±3 V (High-Z)
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1Vpp, Typical) Pulse Width Jitter Ramp Frequency Linearity(Typical) Symmetry Symmetry DC Offset range Accuracy Bandwidth	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable) #1.5 V (50 Ω) ±3 V (High-Z) ±( offset *1%+3 mV)
Square/Pulse Frequency Fuely Cycle Rise/Fall time Vovershoot (1kHz, 1Vpp, Typical) Pulse Width Utter Inter Ramp Frequency Linearity(Typical) Symmetry DC Offset range Accuracy Bandwidth Arbitrary Wave	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable) #1.5 V (50 Ω) ±3 V (High-Z) ±(Ioffset]*1%+3 mV) >25 MHz (-3 dB)
Square/Pulse Frequency Duty Cycle Cise/Fall time Cise/Fall time Cise/Fall time Cise/Fall time Cise/Fall time Cise/Fall time Cise/Fall Cise/Fall Cise/Fall Cise/Cise/Cise/Cise/Cise/Cise/Cise/Cise/	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable) 4 ±1.5 V (50 Ω) ±3 V (High-Z) ±( offset *1%+3 mV) 2 25 MHz (-3 dB) 1 μHz ~ 5 MHz
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, Vypp, Typical) Pulse Width Dutse Width Chearency Frequency Symmetry Doc Symmetry Coffset range Coffset range Accuracy Accuracy Bandwidth Coffset Frequency Frequency Wave Length	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable) 4 ±1.5 V (50 Ω) ±3 V (High-Z) ±(Ioffset *1%+3 mV) 225 MHz (-3 dB) 1 μHz ~ 5 MHz 16 Kpts
Square/Pulse Frequency Duty Cycle Rise/Fall time Overshoot (1kHz, 1/vpp, Typical) Pulse Width Jitter Ramp Frequency Cinearity(Typical) Symmetry DC Offset range Accuracy Noise Bandwidth Arbitrary Wave Frequency	5 MHz - 25 MHz -45 dBc 1 μHz ~ 10 MHz 20% ~ 80% < 24 ns (10% ~ 90%) < 3% > 50 ns < 500 ps + 10 ppm 1 μHz ~ 300 kHz < 0.1% of Pk-Pk (Typical, 1 kHz, 1 Vpp, 100% Symmetry) 0% ~ 100% ( Adjustable) 4 ±1.5 V (50 Ω) ±3 V (High-Z) ±( offset *1%+3 mV) 2 25 MHz (-3 dB) 1 μHz ~ 5 MHz

Digital Channels (Optional for SDS1000X+)			
No. of Channels	16		
Max. Sampling Rate	500 MSa/s		
Memory Depth	14 Mpts/CH		
Min. Detectable Pulse Width	4 ns		
Level Group	D0~D7, D8~D15		
Level Range	-3 V~3 V		
Logic Type	TTL, CMOS, LVCMOS 3.3, LVCMOS 2.5, custom		
Skew	D0~D15: ±1 sampling interval Digital to Analog: ± (1 sampling interval +1 ns)		

#### **I/O** Standard USB Host, USB Device, LAN, Pass/Fail, Trigger Out Pass/Fail 3.3 V TTL Output **Display (Screen)** Display Type 8 inch TFT-LCD **Display Resolution** 800×480 **Display** Color 24 bit Contrast (Typical) 500:1 Backlight 300 nit 8 x 14 divisions Range **Display (Waveform)** Display Mode Dot, Vector Persist Time Off, 1 Sec, 5 Sec, 10 Sec, 30 Sec, Infinite Color Display Normal, Color Screen Saver $1\ \text{min},\,5\ \text{min},\,10\ \text{min},\,30\ \text{min},\,1\ \text{hour, Off}$ Language Simplified Chinese, Traditional Chinese, English, French, Japanese, Korean, German, Russian, Italian, Portuguese **Environments** Temperature Operating: 10 °C $\sim$ +40 °C Non-operating: -20 $^\circ\text{C}$ +60 $^\circ\text{C}$ Humidity Operating: 85%RH, 40 °C , 24 hours Non-operating: 85%RH, 65 $^\circ\!\mathrm{C}$ , 24 hours Height Operating: ≤3000 m Non-operating: ≤15,266 m Electromagnetic 2004/108/EC Compatibility Execution Standard EN 61326-1:2006 EN 61000-3-2:2006 + A2:2009, EN 61000-3-3:2008 Safety 2006/95/EC Execution Standard EN 61010-1:2010/EN 61010-2-030:2010 **Mechanical** Dimensions Length 340 mm Width 123 mm Height 184 mm Weight N.W: 3.26 Kg; G.W: 4.25 Kg **Power Supply** Input Voltage 100 ~ 240 VAC, CAT II, Auto selection 50/ 60/ 400 Hz Frequency 50 W Max Power

## SDS1000X/SDS1000X+ Probes & Accessories

Туре	Model	Picture	Specifications
Passive Probe	PP470		Bandwidth: 70 MHz, 1 X/10 X, 1 M/10 Mohm, 300 V/600 V
	PP510		Bandwidth: 100 MHz, 1 X/10 X, 1 M/10 Mohm, 300 V/600 V
	PP215		Bandwidth: 200 MHz, 1 X/10 X, 1 M/10 Mohm, 300 V/600 V
Logic Probe	SPL1016		16 Channel Logic Probe
Current Probe	CP4020		Bandwidth: 100 KHz; Maximum continuous current 20 Arms; Peak current 60 A; Switching ratio: 50 mV/A; 5 mV/A; DC measurement accuracy: 50 mV/A (0.4 A-10 ApK) ± 2%; 5 mV/A (1 A-60 ApK)±2%; 9 V battery-powered
	CP4050		Bandwidth: 1 MHz; Maximum continuous current 50 Arms; Peak current 140 A; Switching ratio: 500 mV/A; 50 mV/A; DC measurement measurement accuracy: 500 mV/A (20 mA-14 ApK) ±3%±20 mA; 50 mV/A (200 mA-100 ApK )±4%± 200 mA; 50 mV/A (100 A-140 ApK)±15% max; 9 V battery-powered
	CP4070		Bandwidth: 150 KHz; Maximum continuous current 70 Arms; Peak current 200 A; Switching ratio: 50 mV/A; 5 mV/A; DC measurement accuracy: 50 mV/A (0.4 A-10 ApK)±2%±5 mV/A (1 A-200 ApK)±2%; 9 V battery-powered
	CP4070A		Bandwidth: 300 KHz; Maximum continuous current 70 Arms; Peak current 200 A; Switching ratio: 100 mV/A;10 mV/A; DC measurement accuracy: 100 mV/A (50 mA-10 ApK) ±3%±50 mA; 10 mV/A (500 mA-40 ApK) ±4%±50 mA; 10 mV/A (40 A-200 ApK) ±15% max; 9 V battery-powered
	CP5030		Bandwidth: 50 MHz; Maximum continuous current 30 Arms; Peak current 50 A;Switching ratio: 100 mV/A, 1 V/A; AC/DC measurement accuracy: 1 A (±1%±1 mA); 100 mV/A (±1%±10 mA); Standard DC 12 V/1.2 A power adapter
	СР5030А		Bandwidth: 100 MHz; Maximum continuous current 30 Arms; Peak current 50 A; Switching ratio: 100 mV/A, 1 V/A; AC/DC measurement accuracy: 1 A (±1%±1 mA); 100 mV/A (±1%±10 mA); Standard DC 12 V/1.2 A power adapter
	CP5150		Bandwidth: 12 MHz; Maximum continuous current 150 Arms; Peak current 300 A; Switching ratio: 100 mV/A, 1 V/A; AC/DC measurement accuracy: 100 mV/A (±1%±1 mA); 10 mV/A (±1%±10 mA); Standard DC 12 V/1.2 A power adapter
	CP5500		Bandwidth: 5 MHz; Maximum continuous current 500 Arms; Peak current 750 A; Switching ratio: 100 mV/A, 10 mV/A; AC/DC measurement accuracy: 100 mV/A (±1%±1 mA); 10 mV/A (±1%±10 mA); Standard DC 12 V/1.2 A power adapter
High Voltage Differential Probe	DPB4080		Bandwidth: 50 MHz; Maximum input differential voltage 800 V (DC + Peak AC); Range selection (attenuation ratio):10 X/100 X; Accuracy: ±1%; Standard DC 9 V/1 A power adapter
	DPB5150		Bandwidth: 70 MHz; Maximum input differential voltage 1500 V (DC + Peak AC); Range selection (attenuation ratio): 50 X/500 X; Accuracy: ±2%; Standard 5 V/1 A USB power adapter

Туре	Model	Picture	Specifications
High Voltage Differential Probe	DPB5150A		Bandwidth: 100 MHz; Maximum input differential voltage 1500 V (DC + Peak AC); Range selection (attenuation ratio): 50 X/500 X; Accuracy: ±2%; Standard 5 V/1 A USB power adapter
	DPB5700		Bandwidth: 70 MHz; Maximum input differential voltage 7000 V (DC + Peak AC); Range selection (attenuation ratio): 100 X/1000 X; Accuracy: ±2%; Standard 5 V/1 A USB power adapter
	DPB5700A		Bandwidth: 100 MHz; Maximum input differential voltage 7000 V (DC + Peak AC); Range selection (attenuation ratio): 100 X/1000 X; Accuracy: ±2%; Standard 5 V/1 A USB power adapter
High Voltage Probe	HPB4010		Bandwidth: 40 MHz; Maximum measurement voltage DC: 10 KV; AC (rms) : 7 KV (sine) ; AC (Vpp) : 20 KV (Pulse); attenuation ratio 1:1000; Accuracy: ≤3%
Isolated front end	ISFE		USB 5 V power supply, plug and play, the maximum input voltage 600 Vp-p, floating test. Work with oscilloscopes.
Demo board	STB Test Board		Optional accessories for experimental teaching and product demos
Deskew fixture	DF2001A		Deskew fixture for voltage and current probes

### **Ordering information**

Product Description	Product Name
100 MHz Two Channels	SDS1102X
200 MHz Two Channels	SDS1202X
100 MHz Two Channels, Built-In Waveform Generator (Standard), 16 Digital Channels (Option, *Requires SPL1016 & SDS-1000X-LA)	SDS1102X+
200 MHz Two Channels, Built-In Waveform Generator (Standard), 16 Digital Channels (Option, *Requires SPL1016 & SDS-1000X-LA)	SDS1202X+

Standard Accessories	
USB Cable -1	
Quick Start-1	
Certification-1	
Passive Probe-2	
Power Cord -1	
CD (Included User Manual and EasyScopeX software)-1	
Optional Accessories	
I2C,SPI,UART/RS232,CAN,LIN Decoder	SDS-1000X-DC
16 Channels MSO (Software)	SDS-1000X-LA
16 Digital Channels Logic Probe	SPL1016
Isolated Front End	ISFE
STB Demo Source	STB
High Voltage Probe	HPB4010
Current Probe	CP4020/CP4050/CP4070/ CP4070A/CP5030/CP5030A/ CP5150/CP5500
Differential Probe	DPB4080/DPB5150/DPB5150A/DPB5700/DPB5700A



## SDS1000X SDS1000X+ Series Digital Oscilloscope



#### About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, function/arbitrary waveform generators, digital multimeters, DC power supplies, spectrum analyzers, isolated handheld oscilloscopes and other general purpose test instrumentation. Since its first oscilloscope, the ADS7000 series, was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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