SDS3000X HD
Series

Digital Storage Oscilloscope

Data Sheet

EN01A

12-bit HARDWARE

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SIGLENT TECHNOLOGIES CO.,LTD

SDS3104X HD
SDS3054X HD
SDS3034X HD

Product Overview

SIGLENT's SDS3000X HD series Digital Storage Oscilloscopes are available in bandwidths of 1 GHz, 500 MHz and 350 MHz, have 12-bit ADCs with sample rate up to 4GSa/s, maximum record length of 400 Mpts/ch, and display up to 4 analog channels + 16 digital channels for high performance mixed signal analysis.

The SDS3000X HD series employs Siglent's SPO technology with a maximum waveform capture rate of up to 200,000 wfm/s, 256-level intensity grading display function plus a color temperature display mode. It also employs an innovative digital trigger system with high sensitivity and low jitter. The trigger system supports multiple powerful triggering modes including serial bus triggering. Tools such as History waveform recording, Search and Navigate functions, Mask Test, Bode Plot and Power Analysis allow for extended waveform records to be captured, stored, and analyzed. An impressive array of measurement and math capabilities, options for a 50 MHz arbitrary waveform generator, as well as serial decoding are also features of the SDS3000X HD .

The large 10.1" display capacitive touch screen supports multi-touch gestures, with the addition of user-friendly UI design, can greatly improve the operational efficiency. It also supports mouse control, and remote web control over LAN.



Key Features

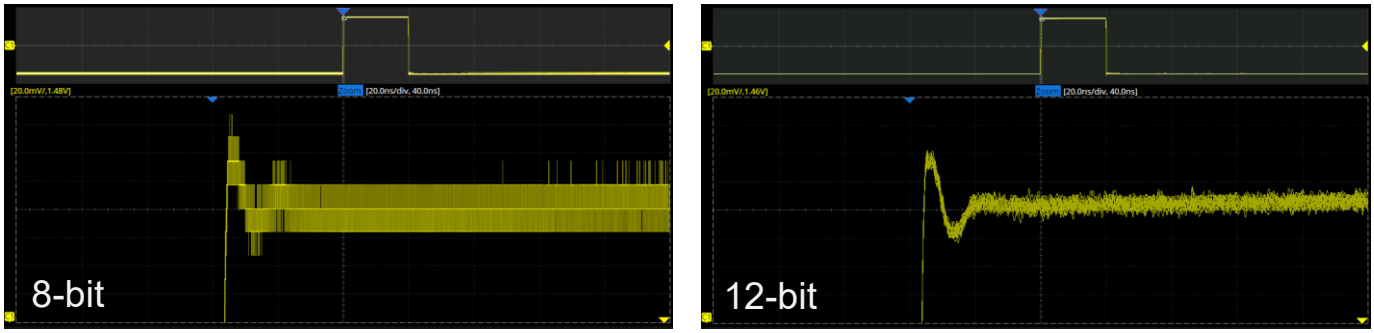
- 4 analog channels, up to 1 GHz bandwidth with up to 4GSa/s sample rate
- 12-bit ADC
- Low background noise: 125 μVrms @ 1 GHz bandwidth
- SPO technology
  - Waveform capture rates up to 200,000 wfm/s in Normal mode and 890,000 wfm/s in Sequence mode
  - Supports 256-level intensity grading and color temperature display modes
  - Up to 400 Mpts/ch record length
  - Digital trigger system
- Intelligent trigger: Edge, Slope, Pulse, Window, Runt, Interval, Dropout, Pattern, Qualified, Nth edge, Setup/hold, Delay and Video (HDTV supported). Zone Trigger simplifies advanced triggering
- Serial bus triggering and decoder, supports protocols I^2C, SPI, UART, CAN, LIN, CAN FD, FlexRay, I^2S, MIL-STD-1553B, SENT, Manchester and ARINC429
- 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 between segments to capture the qualifying event
- History waveform record (History) function, the maximum recorded waveform length is 80,000 frames
- Automatic measurements on 50+ parameters, supports statistics with histogram, track, trend, Gating measurement, and measurements on Math, History and Memory traces
- 4 Math traces (4 Mpts FFT, Filter, addition, subtraction, multiplication, division, integration, differential, square root, etc.), supports formula editor
- Abundant data analysis functions such as Search, Navigate, Digital Voltmeter, Counter, Waveform Histogram, Bode plot and Power Analysis
- High Speed hardware-based Average, ERES; High Speed hardware-based Mask Test function, with Mask Editor tool for creating user-defined masks
- 16 digital channels (optional)
- External 50 MHz waveform generator (optional)
- Large 10.1" TFT-LCD display with 1024 * 600 resolution; Capacitive touch screen supports multi-touch gestures
- Interfaces include: 2x USB 3.0 Host, 1x USB 2.0 Host , USB 3.0 Device (USBTMC) , 1000M LAN ((VXI-11/Telnet/Socket/LXI)), External Triger In, Aux Out (Pass/Fail, Trigger Out)
- Built-in web server supports remote control over the LAN port using a web browser. Supports SCPI remote control commands. Supports external mouse and keyboard

Models and Key Specifications

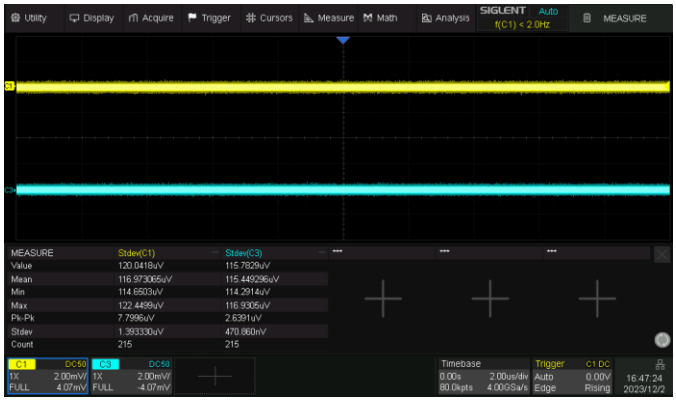
Model	SDS3104X HD	SDS3054X HD	SDS3034X HD
Analog channels	4 + EXT		
Bandwidth	1 GHz (800 MHz in non-interleaving mode)	500 MHz	350 MHz
Sample rate (Max.)	4 GSa/s (interleaving mode), 2 GSa/s (non-interleaving mode)		
Memory depth (Max.)	400 Mpts/ch (interleaving mode: single-channel), 200 Mpts/ch (interleaving mode: dual-channel), 100 Mpts/ch (non-interleaving mode)		
Waveform capture rate (Max.)	Normal mode：200,000 wfm/s; Sequence mode：890,000 wfm/s		
Vertical resolution	12-bit. Up to 16-bit in ERES mode		
Trigger type	Edge, Slope, Pulse width, Window, Runt, Interval, Dropout, Pattern, Video, Qualified, Nth edge, Setup/hold, Delay, Serial		
Serial trigger and decode	Standard: I2C, SPI, UART, CAN, LIN Optional: CAN FD, FlexRay, I2S, MIL-STD-1553B, SENT, Manchester (decode only), ARINC429		
Measurement	50+ parameters, statistics, histogram, trend, and track supported		
Math	4 traces 4 Mpts FFT, +, -, x, ÷, ∫dt, d/dt, √, Identity, Negation, Absolute, Sign, ex, 10x, ln, lg, Interpolation, MaxHold, MinHold, ERES, Average, Filter. Supports formula editor		
Data analysis	Search, Navigate, History, Mask Test, Digital Voltmeter, Counter, Waveform Histogram, Bode plot, and Power Analysis		
Digital channel (optional)	16-channel; maximum sample rate up to 1 GSa/s; record length up to 100 Mpts		
Waveform generator (optional)	Single-channel SAG1021I, frequency up to 50 MHz, 125 MSa/s sample rate, 16 kpts waveform memory		
I/O	USB 3.0 Host x2, USB 2.0 Host x1, USB 3.0 Device, 10M/100M/1000M LAN, External trigger, Auxiliary output (TRIG OUT, PASS/FAIL)		
Probe (Standard)	One 500 MHz passive probe supplied for each channel		
Display	10.1 TFT-LCD with capacitive touch screen (1024*600)		

Functions & Characteristics

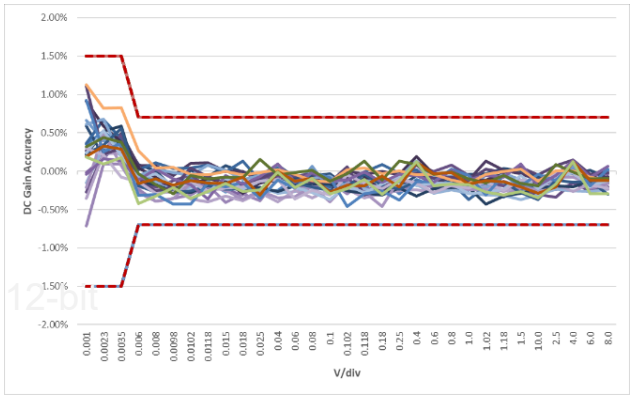
12-bit High Resolution



12-bit resolution shows you more details and less noise on the waveform.



Low noise floor: 125 μVrms at 1 GHz bandwidth



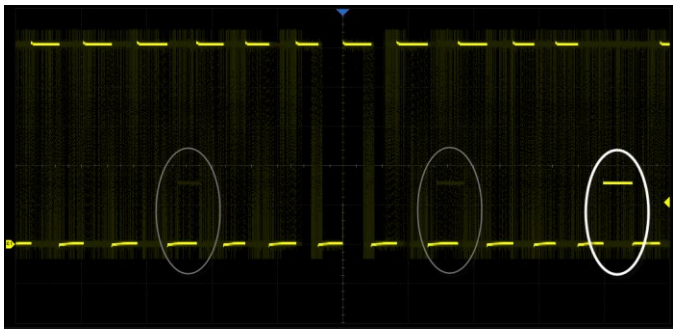
0.5% DC gain accuracy

Excellent User Interface and User Experience



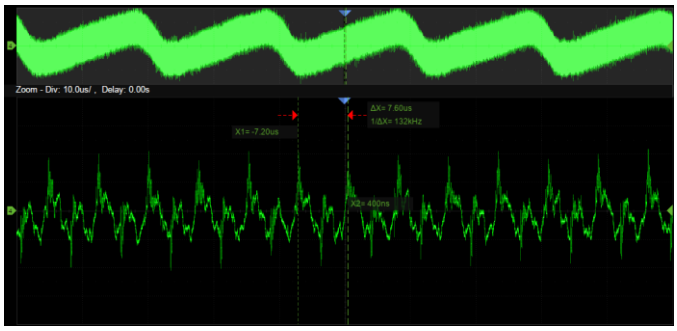
- 10.1” display with 1024x600 resolution
- Capacitive touch screen, supporting multi-touch gestures, can move or scale the waveform traces quickly by finger-touch movements, which greatly improves the operation efficiency
- Built-in WebServer supports remote control on a web page over LAN
- Supports external mouse and keyboard

High Waveform Update Rate



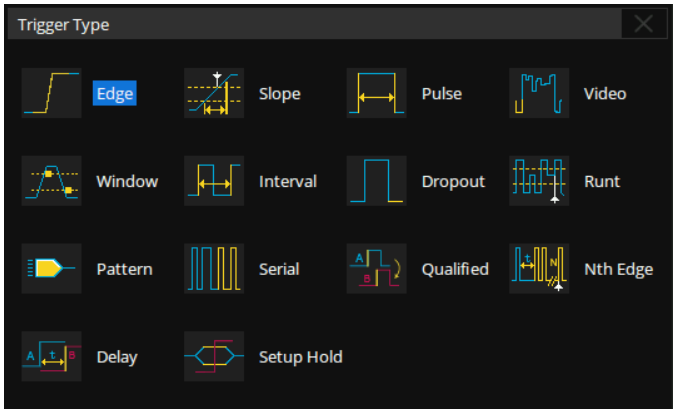
With a waveform update rate of up to 200,000 wfm/s, the oscilloscope can easily capture unusual or low-probability events. In Sequence mode, the waveform capture rate can reach 890,000 wfm/s

Deep Record Length



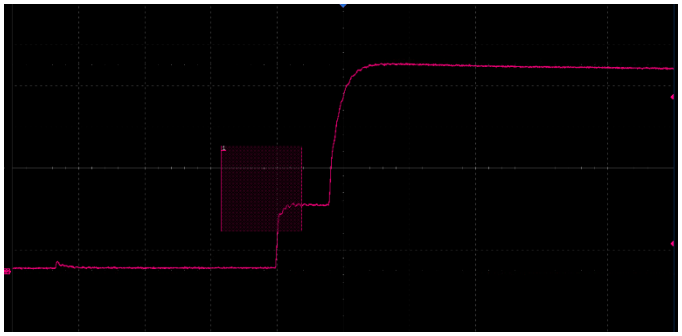
Using hardware-based Zoom technique and record length of up to 400 Mpts, users can select a slower timebase without compromising the sample rate, and then quickly zoom in to focus on the area of interest

Multiple Trigger Functions



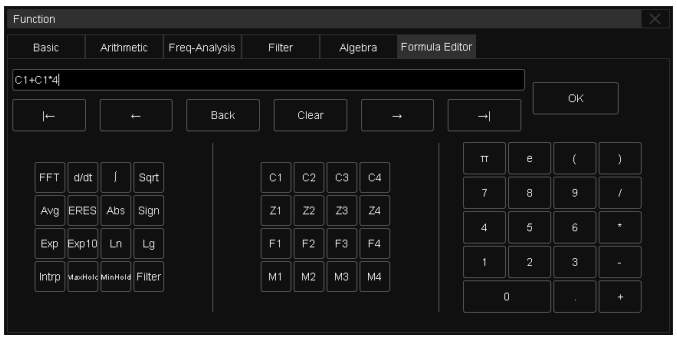
Edge, Slope, Pulse, Video, Windows, Runt, Interval, Dropout, Pattern, Qualified, Nth edge, Setup/hold, Delay and serial trigger

Zone Trigger



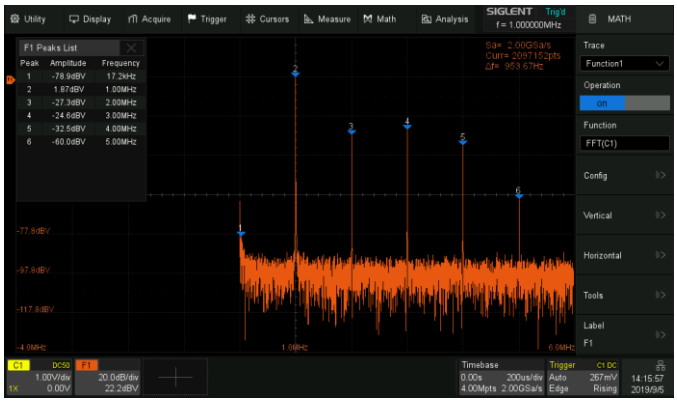
Zone Trigger is available for advanced triggering. Combine spatial triggering with common trigger modes to isolate signals of interest

Advanced Math Function



In addition to the traditional (+, -, X, /) operations, FFT, Filter, integration, differential, square root, and more are supported. Formula Editor is available for more complex operations. 4 math traces are available.

Deep Memory FFT



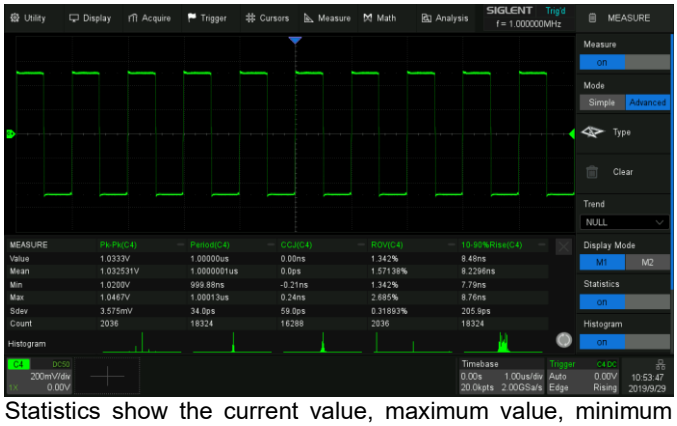
FFT supports up to 4 Mpts operation. This provides high-frequency resolution with a fast refresh rate. The FFT function also supports a variety of window functions so that it can adapt to different spectrum measurement needs. Three modes (Normal, Average, and Max hold) can satisfy different requirements for observing the power spectrum. Auto peak detection and markers are supported.

Measurements of a Variety of Parameters



Parameter measurements include 4 categories: horizontal, vertical, miscellaneous, and CH delay providing a total of 50+ different types of measurements. Measurements can be performed within a specified gate period. Measurements on Math, Reference, and History frames are supported

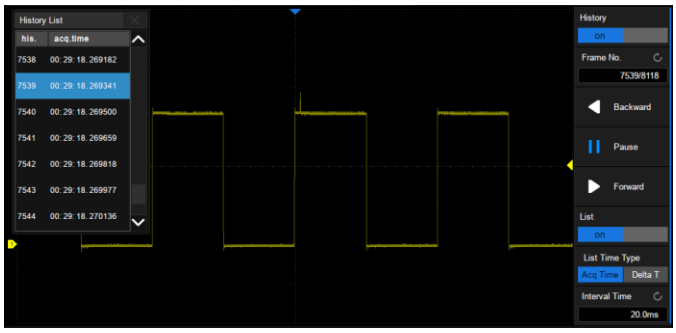
Parameter Statistics Function



Statistics show the current value, maximum value, minimum value, standard deviation, and mean value of up to 12 parameters simultaneously. A histogram is available to show the probability distribution of a parameter. Trend and Track are available to show the parameter value vs. time.

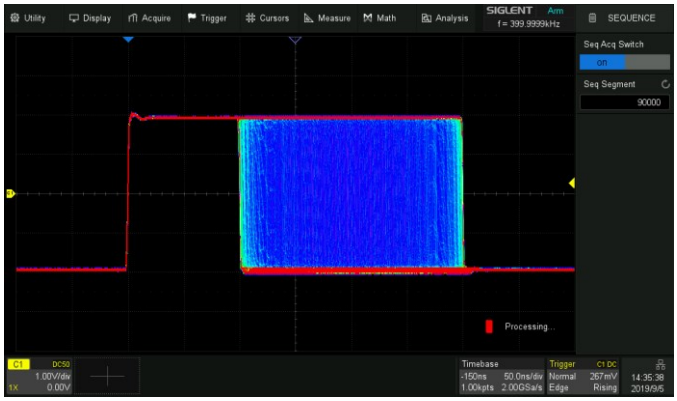
For horizontal parameters such as period, all results are extracted from a frame, instead of just calculating the first one. This accelerates statistics on horizontal measurements and enables distribution observation in a frame using Histogram and Track

History Mode



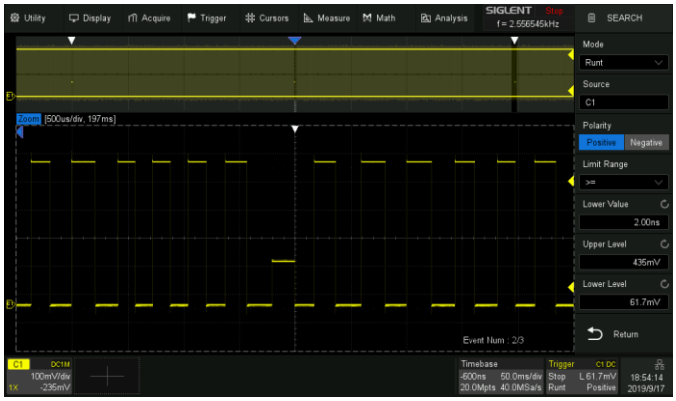
History function can record up to 80,000 frames of waveforms. The recording is executed automatically so that the customer can playback the history waveforms at any time to observe unusual events and quickly locate the area of interest using the cursors or measurements. The failed frames of the Mask Test can be stored as history

Sequence Mode



Segmented memory collection will store the waveform into multiple memory segments (up to 80,000) and each segment will store a triggered waveform as well the dead time information. The interval between segments can be as small as 1.12 μs. All of the segments can be played back using the History function

Search and Navigate



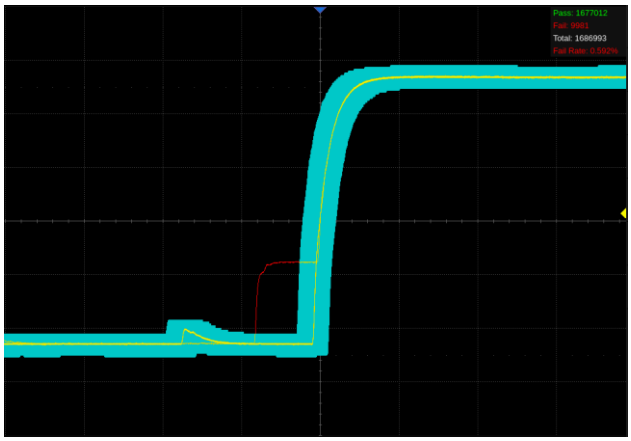
The oscilloscope can search events specified by the user in a frame. Events flagged by the Search can be recalled automatically using Navigate. It can also navigate by time (delay position) and history frames

Serial Bus Decode

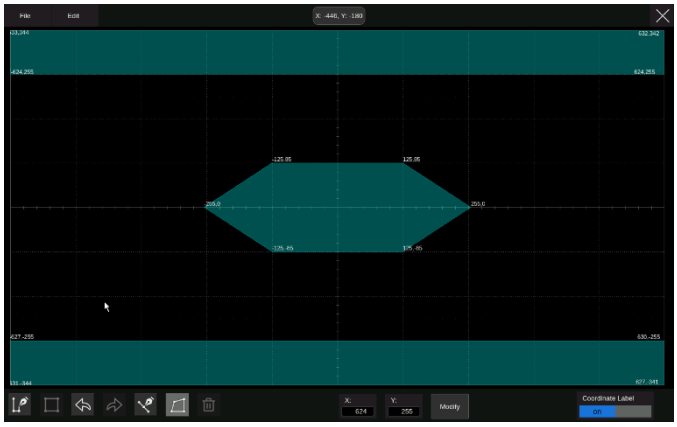


Display the decoded characters through the events list. Bus protocol information can be quickly and intuitively displayed in tabular form. I^2C, SPI, UART, CAN, LIN, CAN FD, FlexRay, I^2S, MIL-STD-1553B, SENT, Manchester and ARINC429 are supported

Hardware-based High Speed Mask Test Function



The oscilloscope utilizes a hardware-based Mask Test function, performing up to 28,000 Pass / Fail decisions each second. It is easy to generate user-defined test templates to provide trace mask comparisons, making it suitable for long-term signal monitoring or automated production line testing



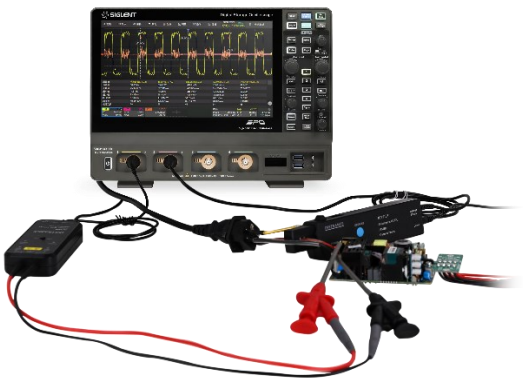
Built-in Mask Editor application helps to create custom masks

Bode Plot



The oscilloscope can control the SIGLENT isolated USB AWG module or a stand-alone SIGLENT SDG generator, to scan the amplitude and phase-frequency response of the DUT, and display the data as a Bode Plot. This makes it possible to replace expensive network analyzers in some applications

Power Analysis (Optional)



The Power Analysis option provides a full suite of power measurements and analysis, which greatly improve the measurement efficiency in switching power supplies and power devices design

Digital Channels / MSO (Optional)



Four analog channels plus 16 digital channels enable users to acquire and trigger the waveforms then analyze the pattern, simultaneously with one instrument

50 MHz Function/Arbitrary Waveform Generator (Optional)



The oscilloscope can control the SAG1021I waveform generator to output a waveform with up to 50 MHz frequency and ±3 V amplitude. Six basic waveforms plus multiple types of arbitrary waveforms are built-in

Specifications

All specifications are not guaranteed unless the following conditions are met:
• The oscilloscope calibration period is current
• The oscilloscope has been working continuously for at least 30 minutes at the specified temperature (18℃ ~ 28℃)

Acquire (analog)	
Sample rate	4 GSa/s (interleaving mode* 1) ， 2 GSa/s (non-interleaving mode* 2)
Memory depth* 3 *4	400 Mpts/ch (interleaving mode, single-channel), 200 Mpts/ch (interleaving mode, dual-channel), 100 Mpts/ch (non-interleaving mode)
Memory management mode	Auto, Fixed sample rate, Fixed memory length
Waveform update rate	Normal mode：up to 200,000 wfm/s Sequence mode：up to 890,000 wfm/s
Intensity grading	256-level
Peak detect	0.5 ns
Average	4, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192
ERES	Enhanced bit: 0.5, 1, 1.5, 2, 2.5, 3, 3.5, 4 bits
Sequence	Up to 80,000 segments, interval between triggers = 1.12 µs min.
History	Up to 80,000 frames
Interpolation	sinx/x, x

* 1: Interleaving mode: only one of C1/C2 and/or only one of C3/C4 activated
* 2: Non-interleaving mode: both C1/C2 and/or both C3/C4 activated
* 3: In Average and ERES modes, the memory depth is 20 Mpts/ch (interleaving mode), 10 Mpts/ch (non-interleaving mode)
* 4: single-channel: only one channel is active; dual-channel: one of C1/C2 and one of C3/C4 activated;

Vertical (analog)	SDS3104X HD	SDS3054X HD	SDS3034X HD
Channel	4 + EXT		
Bandwidth (-3 dB) @ 50 Ω	Interleaving mode：1 GHz Non-interleaving mode：800 MHz	500 MHz	350 MHz
Rise time@50 Ω (typical)	Interleaving mode：450 ps Non-interleaving mode：570 ps	610 ps	830 ps
Bandwidth (-3 dB) @ 1M Ω	500 MHz	500 MHz	350 MHz
Bandwidth limit	Hardware Bandwidth limit: 20 MHz: 20 MHz (±20%) 200 MHz: 200 MHz (±20%)		
Resolution	12-bit		
ENOB *1 (typical)	8.2-bit	8.4-bit	8.5-bit
Noise floor*2 (rms, @50 Ω, typical,1 mV/div)	125 µV	90 µV	70 µV
Range	8 divisions		
Vertical scale (probe 1X)	1 MΩ: 0.5 mV/div – 10 V/div 50 Ω: 0.5 mV/div – 1 V/div 1 MΩ: 0.5 mV/div – 10 V/div 2 µV/div – 10 V/div (Zoom mode) 50 Ω: 0.5 mV/div – 1 V/div 2 µV/div – 1 V/div (Zoom mode)		
DC gain accuracy	0.5 mV/div ~ 4.95 mV/div: ±1.5 %; 5 mV/div ~ 10 V/div: ±0.5 % typical, ±1.0 % maximum;		
Offset accuracy	± (1% of the offset setting + 0.5% of full scale + 0.02% maximum offset + 1 mV)		
Offset range (probe 1X)	1 MΩ: 0.5 mV/div ~ 5 mV/div: ±1.6 V; 5.1 mV/div ~ 10 mV/div: ±4 V; 10.2 mV/div ~ 20 mV/div:±8 V; 20.5 mV/div ~ 100 mV/div: ±16 V; 102 mV/div ~ 200 mV/div: ±80 V; 205 mV/div ~ 1 V/div: ±160 V; 50 Ω: 0.5 mV/div ~ 5 mV/div: ±1.6V; 5.1 mV/div ~ 10 mV/div: ±4 V; 10.2 mV/div ~ 20 mV/div:±8 V; 20.5 mV/div ~ 1 V/div: ±10 V		

	1.02 V/div ~ 10 V/div: ±400 V		
Low frequency response (AC coupling -3 dB)	6 Hz (typical)		
Overshoot (100 mV/div, 150 ps edge @50 Ω, typical)	18%	10%	7%
Coupling	DC, AC, GND		
Impedance	1 MΩ: (1 MΩ±2%) || (15 pF±3 pF) 50 Ω: 50 Ω±1%		
Max. input voltage	1 MΩ ≤ 400 Vpk (DC + AC), DC~10 kHz 50 Ω ≤ 5V rms		
SFDR	≥ 45dBc		
CH to CH Isolation (@50Ω)	60 dB up to 200 MHz 50 dB up to 500 MHz 40 dB up to 1 GHz	60 dB up to 200 MHz 50 dB up to 500 MHz	60 dB up to 200 MHz 50 dB up to 350 MHz
Probe Attenuation	1X, 10X, 100X, custom		

* 1: 50Ω input impedance, 50 mV/div, 4GSa/s, 24.9943MHz/-1dBFS input

* 2: Use the Stdev (also known as ACrms) measurement

Horizontal	SDS3104X HD	SDS3054X HD	SDS3034X HD
Time scale	200 ps/div – 1000s/div	500 ps/div – 1000s/div	1 ns/div – 1000 s/div
Range	10 divisions		
Display mode	Y-T, X-Y, Roll		
Roll mode	≥ 50 ms/div		
Skew (C1~C4)	< 100 ps		
Time base Accuracy	±2 ppm initial (0~50℃); ±0.5 ppm 1st year aging; ±3 ppm 20-year aging		

Trigger				
Mode	Auto, Normal, Single			
Level	Internal: ±4.1 div from the center of the screen EXT: ± 0.61 V EXT/5: ± 3.05 V			
Ext Trigger input voltage	1 MΩ ≤ 42 Vpk 50 Ω ≤ 5Vrms			
Hold off range	By time: 8 ns ~ 30 s (8 ns step) By event: 1 ~ 10^8			
Coupling	C1~C4 DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 15 Hz LFRJ: Attenuates the frequency components below 2.4 MHz HFRJ: Attenuates the frequency components above 1.3 MHz Noise RJ: Increases the trigger hysteresis EXT DC: Passes all components of the signal AC: Blocks DC components and attenuates signals below 18 Hz LFRJ: Attenuates the frequency components below 7.5 kHz HFRJ: Attenuates the frequency components above 250 kHz			
Accuracy (typical)	C1 ~ C4: ±0.2 div EXT: ±0.3 div			
Sensitivity	C1 ~ C4:		Noise RJ = OFF	Noise RJ = ON
		>10 mV/div:	±0.26 div	±0.33 div
		5 mV/div~10 mV/div:	±0.26 div	±0.33 div
		≤ 2 mV/div:	±0.5 div	±0.5 div
	EXT:	200 mVpp, DC ~ 10 MHz 300 mVpp, 10 MHz ~ bandwidth（300 MHz）		
	EXT/5:	1 Vpp, DC ~ 10 MHz		

		1.5 Vpp, 10 MHz ~ bandwidth（300 MHz）
Jitter	C1 ~ C4: < 10 ps rms (typical) ，≥ 6 div Vpp sine，2.5 mV/div ~ 10 V/div EXT: < 200 ps rms	
Displacement	Pre-Trigger: 0 ~ 100% memory Delay-Trigger: 0 ~ 10,000 div	
Zone	Up to 2 zones Source: C1~C4 Property: Intersect, Not Intersect	
Edge Trigger		
Source	C1~C4/EXT/(EXT/5)/AC Line/D0~D15	
Slope	Rising, Falling, Rising & Falling	
Slope Trigger		
Source	C1~C4	
Slope	Rising, Falling	
Limit range	<, >, in range, out of range	
Time range	2 ns ~ 20 s, Resolution = 1 ns	
Pulse Width Trigger		
Source	C1~C4/D0~D15	
Polarity	+width, -width	
Limit range	<, >, in range, out of range	
Time range	2 ns ~ 20 s, Resolution = 1 ns	
Video Trigger		
Source	C1~C4	
Standard	NTSC, PAL, 720p/50, 720p/60, 1080p/50, 1080p/60, 1080i/50, 1080i/60, Custom	
Synchronization	Any, Select	
Trigger Condition	Line, Field	
Window Trigger		
Source	C1~C4	
Window type	Absolute, Relative	
Interval Trigger		
Source	C1~C4/D0~D15	
Slope	Rising, Falling	
Limit range	<, >, in range, out of range	
Time range	2 ns ~ 20 s, Resolution = 1 ns	
Dropout Trigger		
Source	C1~C4/D0~D15	
Timeout type	Edge, State	
Slope	Rising, Falling	
Time range	2 ns ~ 20 s, Resolution = 1 ns	
Runt Trigger		
Source	C1~C4	
Polarity	Positive, Negative	
Limit range	<, >, in range, out of range	
Time range	2 ns ~ 20 s, Resolution = 1 ns	
Pattern Trigger		
Source	C1~C4/D0~D15	
Pattern Setting	Don’t Care, Low, High	
Logic	AND, OR, NAND, NOR	
Limit range	<, >, in range, out of range	
Time range	2 ns ~ 20 s, Resolution = 1 ns	
Qualified Trigger		
Type	State, State with Delay, Edge, Edge with Delay	
Qualified Source	C1~C4/D0~D15	
Edge Trigger Source	C1~C4/D0~D15	
Nth Edge Trigger		
Source	C1~C4/D0~D15	
Slope	Rising, Falling	
Idle time	8 ns ~ 20 s, Resolution = 1 ns	

Edge Number	1 ~ 65535
Delay Trigger	
Source A	C1~C4/D0~D15
Source B	C1~C4/D0~D15
Slope	Rising, Falling
Limit range	<, >, in range, out of range
Time range	2 ns ~ 20 s, Resolution = 1 ns
Serial Trigger	
Source	C1~C4/D0~D15
Protocol	Standard: I²C, SPI, UART, CAN, LIN Optional: CAN FD, FlexRay, I²S, MIL-STD-1553B, SENT
I²C	Type: Start, Stop, Restart, No Ack, EEPROM, Address & Data, Data Length
SPI	Type: Data
UART	Type: Start, Stop, Data, Parity Error
CAN	Type: All, Remote, ID, ID+Data, Error
LIN	Type: Break, Frame ID, ID+Data, Error
CAN FD（Optional）	Type: Start, Remote, ID, ID+Data, Error
FlexRay（Optional）	Type: TSS, Frame, Symbol, Errors
I²S（Optional）	Type: Data, Mute, Clip, Glitch, Rising Edge, Falling Edge
MIL-STD-1553B（Optional）	Type：Transfer, Word, Error, Timing
SENT（Optional）	Type: Start, Slow channel, Fast channel, Error
ARINC429 (Optional)	Type: Word Start, Word End, Label, Label+Data, Error, Any Bit, Any Bit of 0, Any Bit of 1

Serial Decoder	
Decoders	2
Threshold	-4.1 ~ 4.1 div
List	1 ~ 7 lines
Decoder type	Full duplex
I²C	
Source	C1~C4/D0~D15
Signal	SCL, SDA
Address	7-bit, 10-bit
SPI	
Source	C1~C4/D0~D15
Signal	CLK, MISO, MOSI, CS
Edge Select	Rising, Falling
Chip select	Active high, Active low, Clock timeout
Bit Order	LSB, MSB
UART	
Source	C1~C4/D0~D15
Signal	RX, TX
Data Width	5-bit, 6-bit, 7-bit, 8-bit
Parity Check	None, Odd, Even, Mark, Space
Stop Bit	1-bit, 1.5-bit, 2-bit
Idle Level	Low, High
Bit Order	LSB, MSB
CAN	
Source	C1~C4/D0~D15
LIN	
LIN Version	Ver 1.3, Ver 2.0
Source	C1~C4/D0~D15
Baud Rate	600 bps, 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, Custom
CAN FD（Optional）	
Source	C1~C4/D0~D15
Nominal Baud Rate	10 kbps, 25 kbps, 50 kbps, 100 kbps, 250 kbps, 1 Mbps, Custom
Data Baud Rate	500 kbps, 1 Mbps, 2 Mbps, 5 Mbps, 8 Mbps, 10 Mbps, Custom
FlexRay（Optional）	
Source	C1~C4/D0~D15

Baud Rate	2.5 Mbps, 5 Mbps, 10 Mbps, Custom
I²S（Optional）	
Source	C1~C4/D0~D15
Signal	BCLK, WS, DATA
Audio Variant	Audio-I2S, Audio-LJ, Audio-RJ
Start Bits	0~31
Data Bits	1~32
MIL-STD-1553B（Optional）	
Source	C1~C4
SENT（Optional）	
Source	C1~C4/D0~D15
Manchester（Optional）	
Source	C1~C4
Baud Rate	500 bps~5 Mbps
ARINC429（Optional）	
Source	C1~C4
Baud Rate	12.5 kbps~100 kbps, tolerance 1%~20%
Word format	L/SDI/D/SSM，L/D/SSM，L/D

Measurement

Automatic Measurement	
Source	C1~C4, D0~D15, Z1~Z4, F1~F4, M1~M4, Ref, History
Mode	Simple, Advanced
Range	Screen Gated: inside screen, definable with separate Gate cursors
Custom Threshold	Upper, Middle, Lower
No. of Measurements	Display 12 measurements at the same time (Display mode = M2)
Vertical Parameters	Max, Min, Pk-Pk, Top, Base, Amplitude, Mean, Cycle Mean, Stdev, Cycle Stdev, RMS, Cycle RMS, Median, Cycle Median, FOV, FPRE, ROV, RPRE, Level@Trigger
Horizontal Parameters	Period, Frequency, Time@max, Time@min, +Width, -Width, 10-90%Rise time, 90-10%Fall time, Rise time, Fall time, +Burst Width, -Burst Width, +Duty Cycle, -Duty Cycle, Delay, Time@Middle, Cycle-Cycle jitter
Miscellaneous Parameters	+Area@DC, -Area@DC, Area@DC, Absolute Area@DC, +Area@AC, -Area@AC, Area@AC, Absolute Area@AC, Cycles, Rising Edges, Falling Edges, Edges, Positive pulses, Negative pulses, Positive Slope, Negative Slope
Delay Parameters	Phase, FRFR, FRFF, FFFR, FFFF, FRLR, FRLF, FFLR, FFLF, Skew, Tsu@R, Tsu@F, Th@R, Th@F
Statistics	Current, Mean, Min, Max, Sdev, Count, Histogram, Trend, Track
Statistics Count	Unlimited, 1~1024
Cursors	
Source	C1~C4, D0~D15, F1~F4, M1~M4, Ref, Histogram
Type	Manual : Time X1, X2, (X1-X2), (1/ΔT); Vertical Y1, Y2, (Y1-Y2) Track: Time X1, X2, (X1-X2) Measure: indicates the measurement on specific parameter

Math

Trace	F1~F4
Source	C1~C4, M1~M4, F1~F4, Zoom traces
Operation	FFT, +, -, x, ÷, ∫dt, d/dt, √, Identity, Negation, |x|, Sign, e^x, 10^x, ln, lg, Interpolation, Max hold, Min hold, ERES, Average, Filter, Formula Editor
FFT	Length: 4 Mpts, 2 Mpts, 1 Mpts, 512 kpts, 256 kpts, 128 kpts, 64 kpts, 32 kpts, 16 kpts, 8 kpts, 4 kpts, 2 kpts Window: Rectangular, Blackman, Hanning, Hamming, Flattop Display: Full Screen, Split, Exclusive Mode: Normal, Max hold, Average Tools: Peaks, Markers

Analysis

Search	
Source	C1~C4, History
Mode	Edge, Slope, Pulse, Interval, Runt
Copy setting	Copy from trigger, Copy to trigger

Navigate	
Type	Search event, Time, History frame
Mask Test	
Source	C1~C4，Z1~Z4
Mask creating	Auto (Create mask), Customized (Mask Editor)
Mask test speed	Up to 28,000 frames/s
DVM	
Source	C1~C4
Mode	DC mean, DC RMS, AC RMS, Peak-peak, Amplitude
Plot	Bar, Histogram, Trend
Gate	20 ms
Bode Plot	
Source	C1~C4
Supported signal sources	SAG1021I (Connection: USB), SDG series waveform generators (Connection: USB, LAN)
Sweep type	Simple, Vari-level
Frequency	Mode: Linear, Logarithmic Range: 10 Hz ~ 120 MHz
Measure	Upper cutoff frequency, Lower cutoff frequency, Bandwidth, Gain margin, Phase margin
Power Analysis (optional)	
Measure	Power quality, Current Harmonics, Inrush current, Switching loss, Slew rate, Modulation, Output ripple, Turn on/turn off, Transient response, PSRR, Efficiency, SOA
Histogram	
Source	C1~C4
Type	Horizontal, Vertical, Both
Counter	
Source	C1~C4
Frequency resolution	7 digits
Totalizer	Counter on edges, supports Gate and Trigger

Digital Channels（optional）	
Max. Sampling Rate	1 GSa/s
Memory Depth	100 Mpts/ch
Min. Detectable Pulse Width	3.3 ns
Level Group	D0~D7, D8~D15
Level Range	-10 V~10 V
Logic Type	TTL, CMOS, LVCMOS3.3, LVCMOS2.5, Custom
Skew	D0~D15: ±1 sampling interval Digital to Analog: ± (1 sampling interval +1 ns)

Waveform Generator (optional)	
Channels	1
Max. Output Frequency	50 MHz
Sampling Rate	125 MSa/s
Frequency Resolution	1 μHz
Frequency Accuracy	±50 ppm
Vertical Resolution	14 bit
Amplitude Range	-1.5 V ~ +1.5 V (into 50 Ω) -3 V ~ +3 V (into High-Z)
Waveforms	Sine, Square, Ramp, Pulse, DC, Noise, 45 Arbitrary
Output Impedance	50 Ω ± 2%
Protection	Over voltage protection, Current limit
Isolated voltage	±42 Vpk
Sine	
Frequency	1 μHz ~ 50 MHz
Offset accuracy (10 kHz)	±(1%*offset setting value +3 mVpp)
Amplitude flatness	±0.3 dB, compare to 10 kHz, 2.5 Vpp into 50 Ω
SFDR	DC ~ 1 MHz -60 dBc 1 MHz ~ 5 MHz -55 dBc 5 MHz ~ 25 MHz -50 dBc
Harmonic distortion	DC ~ 5 MHz -50 dBc

	5 MHz ~ 25 MHz -45 dBc
Square/Pulse	
Frequency	1 μHz ~ 10 MHz
Duty cycle	1% ~ 99%
Edge	< 24 ns (10% ~ 90%)
Overshoot	< 3% (typical，1 kHz, 1 Vpp)
Pulse width	> 50 ns
Jitter (cycle-cycle)	< 500 ps + 10 ppm
Ramp	
Frequency	1 μHz ~ 300 kHz
Linearity	< 0.1% of Pk-Pk (typical, 1 kHz, 1 Vpp, 50% symmetry)
Channels	0% ~ 100%
DC	
Offset range	±1.5 V (into 50 Ω) ±3 V (into Hi-Z)
Accuracy	±(|setting value|*1% + 3 mV)
Noise	
Bandwidth (-3 dB)	>50 MHz
Arb	
Frequency	1 μHz ~ 5 MHz
Waveform memory	16 kpts
Sample rate	125 MSa/s
Wave import	From EasyWaveX, from U-disk, directly from waveform data of analog channels

I/O	
Front	USB 3.0 Host x2， Calibration Signal: 1 kHz,3 V Square
Rear	USB 2.0 Host, USB 3.0 Device, LAN: 10/100/1000M (RJ45), External Trigger，EXT: ≤1.5 Vrms，EXT/5: ≤ 7.5Vrms, Auxiliary Output: TRIG OUT(3.3 V LVCMOS), PASS/FAIL OUT(3.3 V TTL)

Display	
Display Type	10.1 TFT LCD with capacitive touch screen
Resolution	1024×600
Contrast (typical)	500:1
Backlight (typical)	500 nit

Display Setting	
Range	8 x 10 grid
Display Type	Dot, Vector
Persistence Time	OFF, 0.1 s, 0.2 s, 0.5 s, 1 s, 5 s, 10 s, 30 s, infinite
Color Display	Normal, Color; Supports customer trace color
Language	Simplified Chinese, Traditional Chinese, English, French, Japanese, German, Spanish, Russian, Italian, Portuguese
Built-in Help System	Simplified Chinese, English

Environmental			
Temperature	Operating: 0 °C ~ 50 °C Non-operating: -30 °C ~ 70 °C		
Humidity	Operating: 5% ~ 90%RH, 30℃, degraded to 50%RH at 50 ℃ Non-operating: 5% ~ 95%		
Altitude	Operating: ≤ 3,000 m, 25 ℃ Non-operating: ≤15,000 m		
Electromagnetic Compatibility	Meets EMC directive (2014/30/EU), meets or exceeds IEC 61326-1:2012/EN61326-1:2013 (Basic)		
	Conducted disturbance	CISPR 11/EN 55011	CLASS A group 1 150 kHz-30 MHz
	Radiated disturbance	CISPR 11/EN 55011	CLASS A group 1 30 MHz-1 GHz

	Electrostatic discharge (ESD)	IEC 61000-4-2/EN 61000-4-2	4.0 kV (Contact),8.0 kV (Air)
	Radio-frequency electromagnetic field Immunity	IEC 61000-4-3/EN 61000-4-3	10 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 2 GHz); 1 V/m (2.0 GHz to 2.7 GHz)
	Electrical fast transients (EFT)	IEC 61000-4-4/EN 61000-4-4	2kV (Input AC Power Ports)
	Surges	IEC 61000-4-5/EN 61000-4-5	1kV (Line to line) 2kV (Line to ground)
	Radio-frequency continuous conducted Immunity	IEC 61000-4-6/EN 61000-4-6	3 V, 0.15-80 MHz
	Voltage dips and interruptions	IEC 61000-4-11/EN 61000-4-11	Voltage Dips: 0% UT during 1 cycle; 40% UT during 10/12 cycles; 70% UT during 25/30 cycles Voltage interruptions: 0% UT during 250/300 cycles
Safety	UL 61010-1:2012/R: 2018-11; CAN/CSA-C22.2 No. 61010-1:2012/A1:2018-11. UL 61010-2-030:2018; CAN/CSA-C22.2 No. 61010-2-030:2018.		
RoHS	EU 2015/863		

Power Supply	
Input Voltage & Frequency	100 ~ 240 Vrms 50/60 Hz
Power consumption	120 W max., 80 W typical, 4 W typical in standby mode

Mechanical	
Dimensions	Length × Height × Width = 317.2 mm × 236.0 mm × 149.0 mm (including knobs and supporting legs)
Weight	Net Weight 4.1 kg, Gross Weight 5.6 kg

Ordering Information

Model	Description
SDS3104X HD	1 GHz, 4 GSa/s, 4-CH, 12-bit, 400 Mpts/ch memory depth, 10.1” capacitive touch screen
SDS3054X HD	500 MHz, 4 GSa/s, 4-CH, 12-bit, 400 Mpts/ch memory depth, 10.1” capacitive touch screen
SDS3034X HD	350 MHz, 4 GSa/s, 4-CH, 12-bit, 400 Mpts/ch memory depth, 10.1” capacitive touch screen

Standard Accessories	Quantity
USB cable	1
Quick start	1
Passive probe (500 MHz)	1/channel
Certificate of calibration	1
Wireless mouse	1
Power cord	1

Optional Accessories	Part No.
USB isolated waveform generator	SAG1021I
16-channel logic probe	SPL2016
Power Analysis deskew fixture	DF2001A
STB3 demo signal source	STB3
USB-GPIB adapter	USB-GPIB
High-speed active probe	SAP1000, SAP2500
High voltage probe	HPB4010
High-speed differential probe	SAP2500D
High voltage differential probe	DPB1300/DPB4080/DPB5150/ DPB5150A/DPB5700/DPB5700A
Current probe	CPL5100/CP4020/CP4050/CP4070/CP4070A CP6030/CP6030A/CP6150/CP6500/SCP5030/SCP5030A/SCP5150/SCP5150A
Bag	BAG-S2

Options	Part No.
Waveform generator (software)	SDS3000HD-FG
16 digital channels (software)	SDS3000HD-16LA
Power Analysis (software)	SDS3000HD-PA
I^2S trigger & decode (software)	SDS3000HD-I2S
MIL-STD-1553B trigger & decode (software)	SDS3000HD-1553B
FlexRay trigger & decode (software)	SDS3000HD-FlexRay
CAN FD trigger & decode (software)	SDS3000HD-CANFD
SENT trigger & decode (software)	SDS3000HD-SENT
Manchester decode (software)	SDS3000HD-Manch
ARINC429 trigger & decode (software)	SDS3000HD-ARINC
350 MHz to 500 MHz bandwidth upgrade (software)	SDS3000HD-BW3T5
350 MHz to 1 GHz bandwidth upgrade (software)	SDS3000HD-BW3TA
500 MHz to 1 GHz bandwidth upgrade (software)	SDS3000HD-BW5TA

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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, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope 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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