UNI-T

Test & Measurement Instruments

MSO5000HD

New Product Series

MSO5104HD | MSO5054HD | MSO5034HD

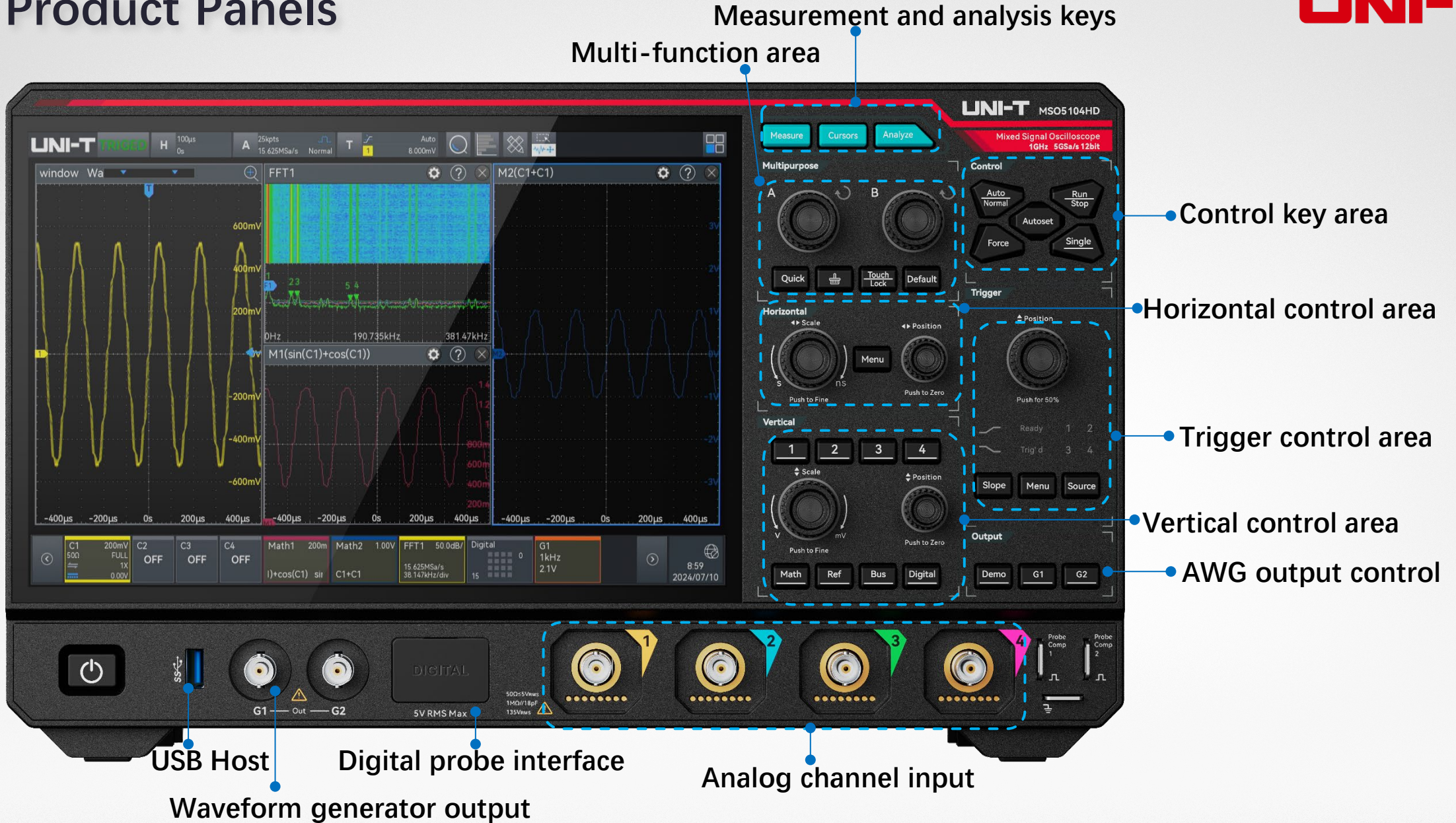**High-Resolution R12™**
Digital Oscilloscope

Product Introduction

MSO5000HD series high-resolution oscilloscope has the maximum bandwidth of 1 GHz, the maximum sampling rate of 5 GSa/s, and is equipped with 4 analog channels and 16 digital channels, with the storage depth of up to 500 Mpts. MSO5000HD series adopts exclusive Ultra Phosphor 3.0 technology, achieving the waveform capture rate of up to 1,500,000 wfms/s, with 256 levels of gray temperature colors, and features an innovative digital trigger system with high trigger sensitivity and low jitter. Multiple advanced measurement and analysis functions and rich trigger decoding types. Can be widely used in communication, aerospace, education and many other industries and fields.

- 4CH+16 MSO
- BW: **1GHz**/500 MHz/350 MHz
- Memory depth 500 Mpts
- 12-bit vertical resolution
- Waveform capture rate **800,000** wfms/s (sequential mode: 1,500,000 wfms/s)
- Versatile testing equipment : Digital oscilloscope, Logic analyzer, Function/arbitrary waveform generator, Spectrum analyzer, Digital voltmeter, Frequency counter, Protocol analyzer, Bode plot analyzer, and Power analyzer
- Supports **timing analysis** of buses: I2C, SPI, CAN
- Parameter measurement statistics add Histogram and Trend chart
- **400,000** frames of hardware real-time waveform non-stop recording and analysis capabilities
- 4 M points enhanced FFT
- 56 waveform parameter measurements
- Multi-Windows display
- Zone trigger function
- Ultra Phosphor 3.0 display technology
- 10.1-inch 1280x800 HD capacitive touch
- Supports SCPI programmable instrument standard commands
- Embedded WebServer

Product Panels

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Measurement and analysis keys

Multi-function area

Control key area

Horizontal control area

Trigger control area

Vertical control area

AWG output control

USB Host

Digital probe interface

Analog channel input

Waveform generator output

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Product Panels

Trigger input

Trigger output,
Pass/fail output,
DVM output

10MHz reference
In/Out

USB Host

HDMI terminal

USB3.0 Device

Gigabit Ethernet Port

Product Comparisons

MSO5000HD

MSO5000HD
BW: 350 MHz, 500 MHz, 1 GHz
SR: 5 GSa/s
Memory depth: 500 Mpts
Capture rate: 1,500,000 wfms/s
Display: 10.1 inch TFT LCD touch

Competitor

DHO4000
BW: 200 MHz, 400 MHz, 800 MHz
SR: 4 GSa/s
Memory depth: 500 Mpts (opt.)
Capture rate: 1,500,000 wfms/s
Display: 10.1 inch TFT LCD touch

SDS3000X HD
BW: 350 MHz, 500 MHz, 1 GHz
SR: 4 GSa/s
Memory depth: 400 Mpts
Capture rate: 890,000 wfms/s
Display: 10.1 inch TFT LCD touch

RTA4000
BW: 200 MHz, 350 MHz, 500 MHz, 1 GHz
SR: 5 GSa/s
Memory depth: 200 Mpts
Capture rate: 64,000 wfms/s
Display: 10.1 inch TFT LCD touch

WaveSurfer 4000HD
BW: 200 MHz, 350 MHz, 500 MHz, 1 GHz
SR: 5 GSa/s
Memory depth: 25 Mpts
Capture rate: 175,000 wfms/s
Display: 12.1 inch TFT LCD touch

Product Comparisons （VS UNI-T Self）

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| Model	MSO5000HD	MSO3000HD		
Bandwidth	350 MHz, 500 MHz, 1 GHz	200 MHz, 350 MHz, 500 MHz		
Channel	4 CH	4 CH		
Sample rate	5 GSa/s (interweave mode), 2.5 GSa/s (non-interweave mode)	2.5 GSa/s (interweave mode), 1.25 GSa/s (non-interweave mode)		
Vertical resolution	12-bit (ERES 16-bit)	12-bit (ERES 16-bit)		
Capture rate	≥800,000 wfms/s; ≥1,500,000 wfms/s (sequence mode)	≥500,000 wfms/s; ≥1,500,000 wfms/s (sequence mode)		
Time scale	500 ps/div to 1 ks/div	200 MHz (2 ns/div to 1 ks/div) 350 MHz(1 ns/div to 1 ks/div) 500 MHz (500 ps/div to 1 ks/div)		
Serial protocol analysis	15 protocol analysis: Standard: RS232/UART, I2C, SPI, CAN, LIN Optional: CAN-FD, FlexRay, Audio, MIL-STD-1553B, Manchester, SENT, ARINC429, 1-WIRE, CAN-XL, I3C	12 protocol analysis: Standard: RS-232/422/485/UART, SPI, I2C Optional: CAN, LIN, CAN-FD, SENT, FlexRay, Audio Bus, MIL STD 1553, ARINC429, Manchester		
Memory depth	500 Mpts	**Vertical scale**	500 µV/div to 10 V/div （1 MΩ） 500 µV/div to 1 V/div （50 Ω）	
Power analysis	Power quality, Harmonics analysis, Switching loss, Ripple analysis, Loop analysis, Safety operation area, Modulation analysis, Surge Current, Rds (on), Slew Rate	**Measurement parameters**	56 , support for parameter snapshots; support for statistical analysis, histograms, trend charts and tracking chart analysis	
MSO	16 CH, real-time sample rate 1.25GSa/s	**Interface**	USB-Host 3.0*3, USB-Device 3.0, LAN, AUX Out, Gen Out, 10 MHz reference input, 10 MHz reference output, HDMI1, WIFI	
AWG	Optional: 2 CH, 50 MHz	**Display**	10.1 inch 1280x800 HD capacitive touch screen	

Product Comparisons(VS Competitors)

UNI-T®

Series	MSO5000HD	DHO4000	SDS3000X HD	RTA4000	WaveSurfer 4000HD
Brand	UNI-T	Rigol	Siglent	R&S	Lecroy
Bandwidth	350MHz, 500MHz, 1GHz	200 MHz, 400 MHz, 800 MHz	350 MHz, 500 MHz,1 GHz	200 MHz, 350 MHz, 500 MHz,1 GHz	200 MHz, 350 MHz, 500 MHz, 1 GHz
Channel	4 CH	4 CH	4 CH	4 CH	4 CH
Sample rate	5 GSa/s(interweave mode) , 2.5 GSa/s(non-interweave mode)	4GSa/s (single-channel), 2 GSa/s(half-channel), 1 GSa/s(all channels)	4 GSa/s (single/dual channel), 2 GSa/s (quad channel)	5 GSa/s (interleaved mode) 2.5GSa/s (non-interleaved mode)	5 GSa/s half channel, 2.5 GSa/s all channel
Vertical resolution	12 bits, 16 bit ERES	12 bit, 16 bit ERES	12 bits, 16 bit ERES	10 bit, 16 bits with high-resolution decimation mode	12 bit
Capture rate	800,000 wfms/s, Sequence mode: 1,500,000 wfms/s	Vector Mode: 50,000 wfms/s, UltraAcquire Mode: 1,500,000 wfms/s	200,000 wfm/s (Normal mode); 890,000 wfm/s (Sequence mode)	64,000 wfms/s	175,000wfms/s
Memory depth	500 Mpts	Option:500 Mpts (single-channel), 250 Mpts (half-channe), 125 Mpts (all channels)	400 Mpts/ch (single channel), 200 Mpts/ch (dual channel), 100 Mpts/ch (quad channel)	100 Mpts (normal mode) 200 Mpts (interleaved)	25Mpts half channels, 12.5Mpts all channels
AWG	2 CH, 50 MHz	No	1 CH, 50 MHz	1 CH, 25 MHz	1CH, 25 MHz
Protocol analysis	15 protocol analysis	9 protocol analysis	12 protocol analysis	8 protocol analysis	7 protocol analysis
Power analysis	14	2	12	16	5
Measurement parameters	56	41	50+	32	25
FFT	4Mpts	1Mpts	4Mpts	128kpts	-
Frequency counter	7-bit	6-bit	7-bit	7-bit	5-bit
DVM	4-bit	4-bit	4-bit	3-bit	4-bit
Display	10.1-inch capacitive touch screen (1280*800)	10.1-inch capacitive touch screen (1280*800)	10.1-inch capacitive touch screen (1024*600)	10.1-inch capacitive touch screen (1280*800)	12.1-inch capacitive touch screen (1280*800)

Product Features
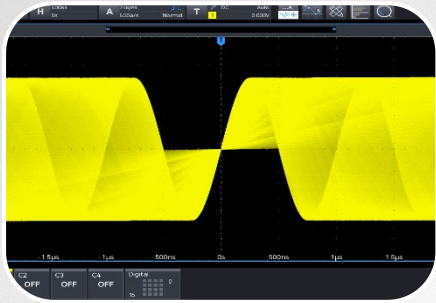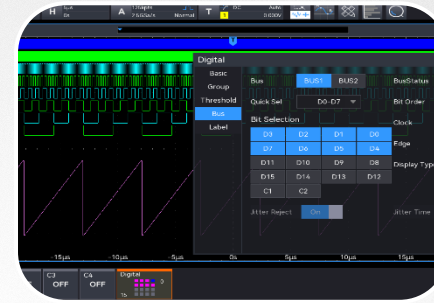

Oscilloscope

1 GHz /500 MHz /350 MHz
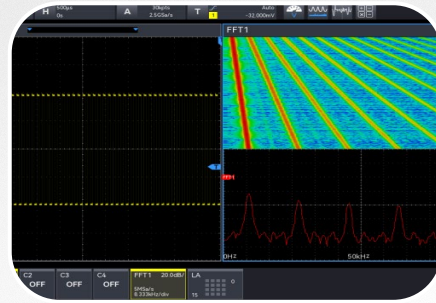
Spectrum Analysis
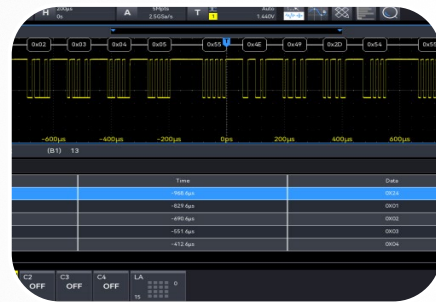
4 Mpts

AWG

2CH 50MHz
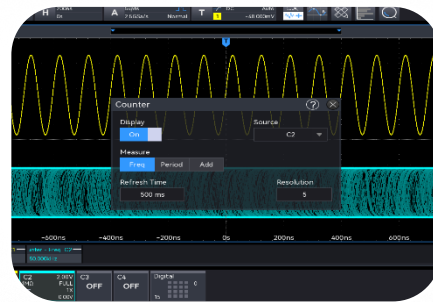
Logic Analysis

16CH,1.25GSa/s

Power Analysis

9+

Timing analysis

I2C, SPI, CAN

Protocol Analysis

15

Frequency Counter
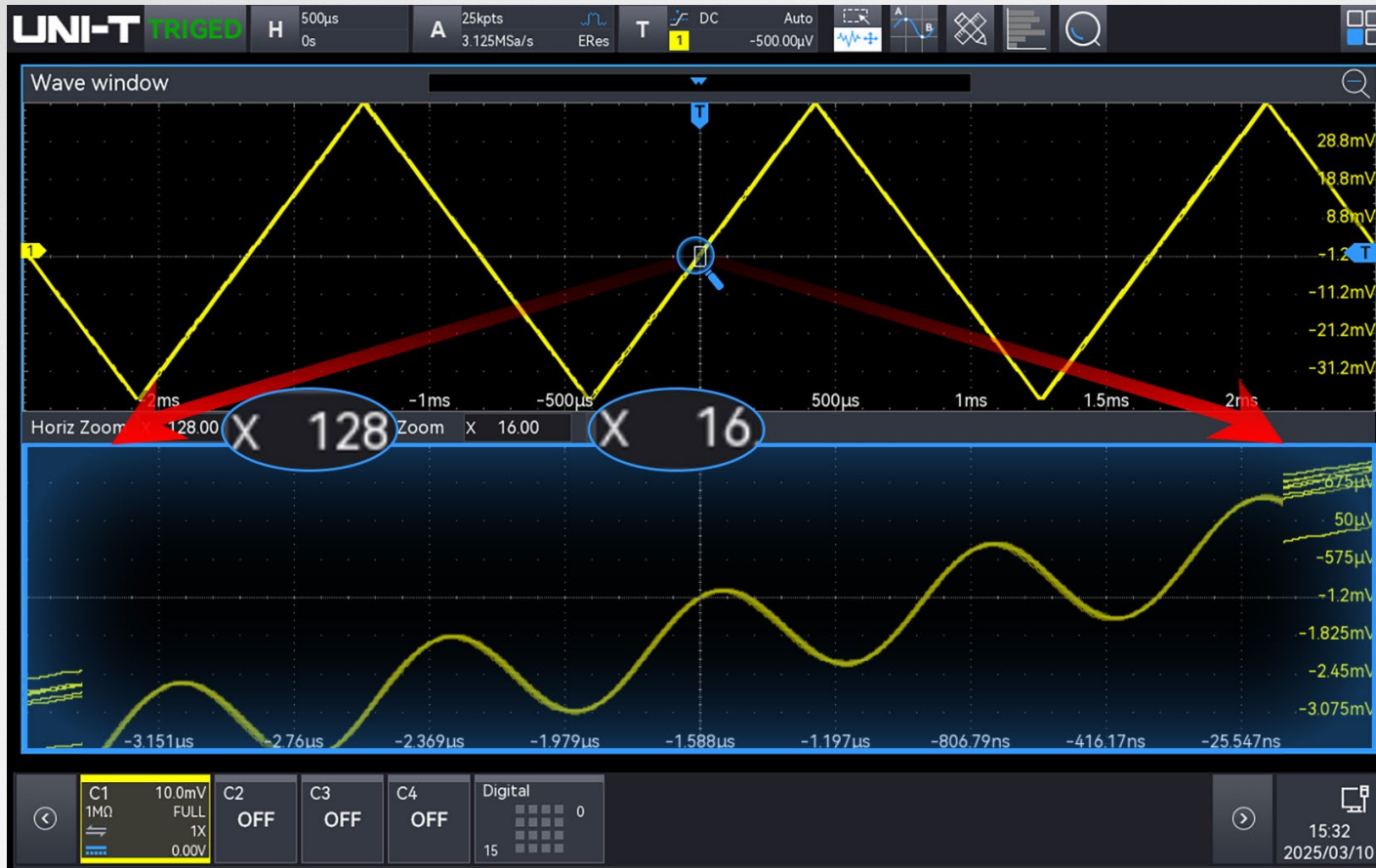
7 bit

DVM

4 bit

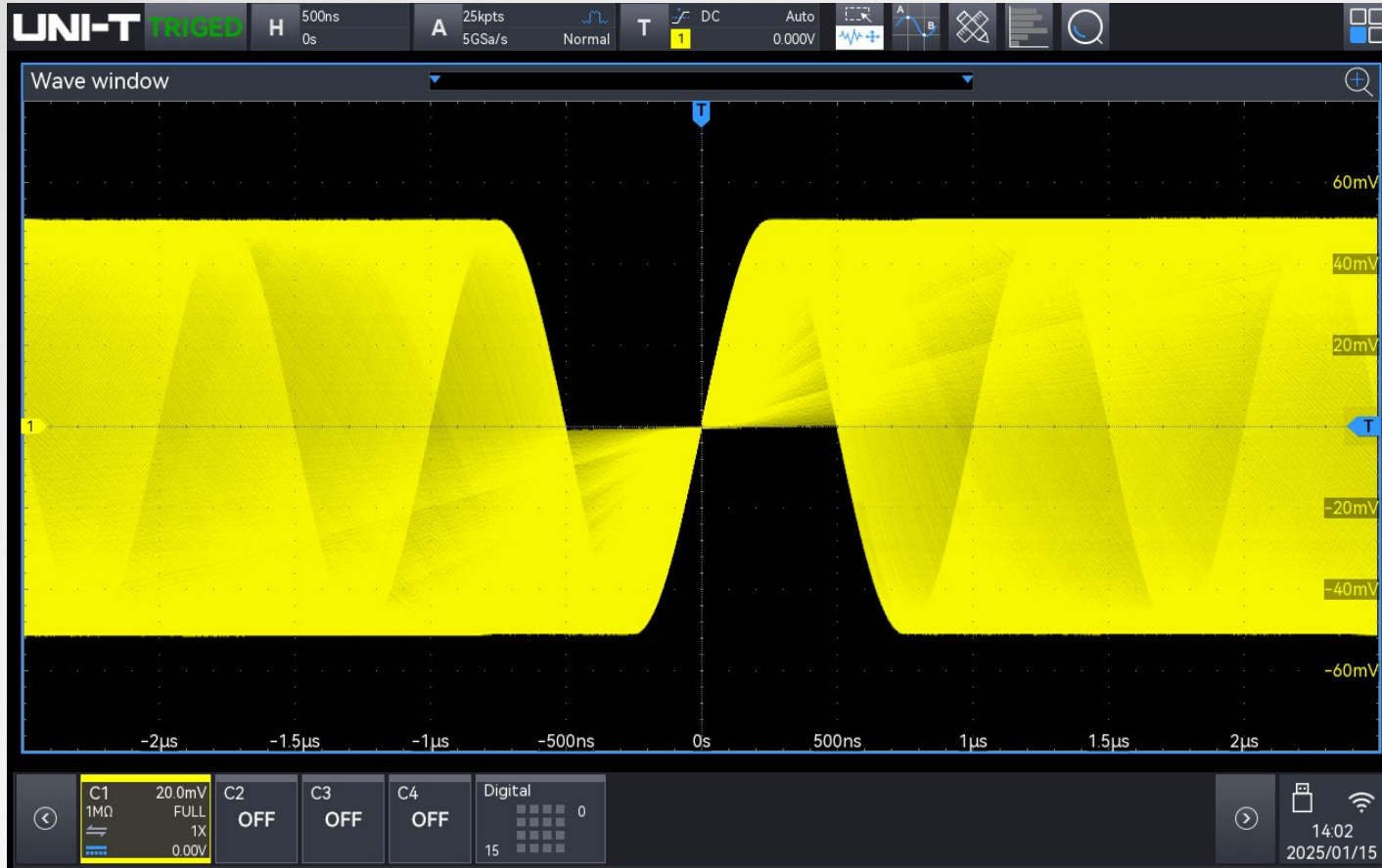**Bode Plot Analysis**

➢ **Versatile** Testing Equipment

This is a cost-optimal oscilloscope for users

Product Features

➢ **12-bit high-resolution ADC**

12-bit high-resolution ADC sampling has a quantization level of up to **4096**, which is **16** times that of a traditional 8-bit ADC, allowing for better restoration of waveform details.
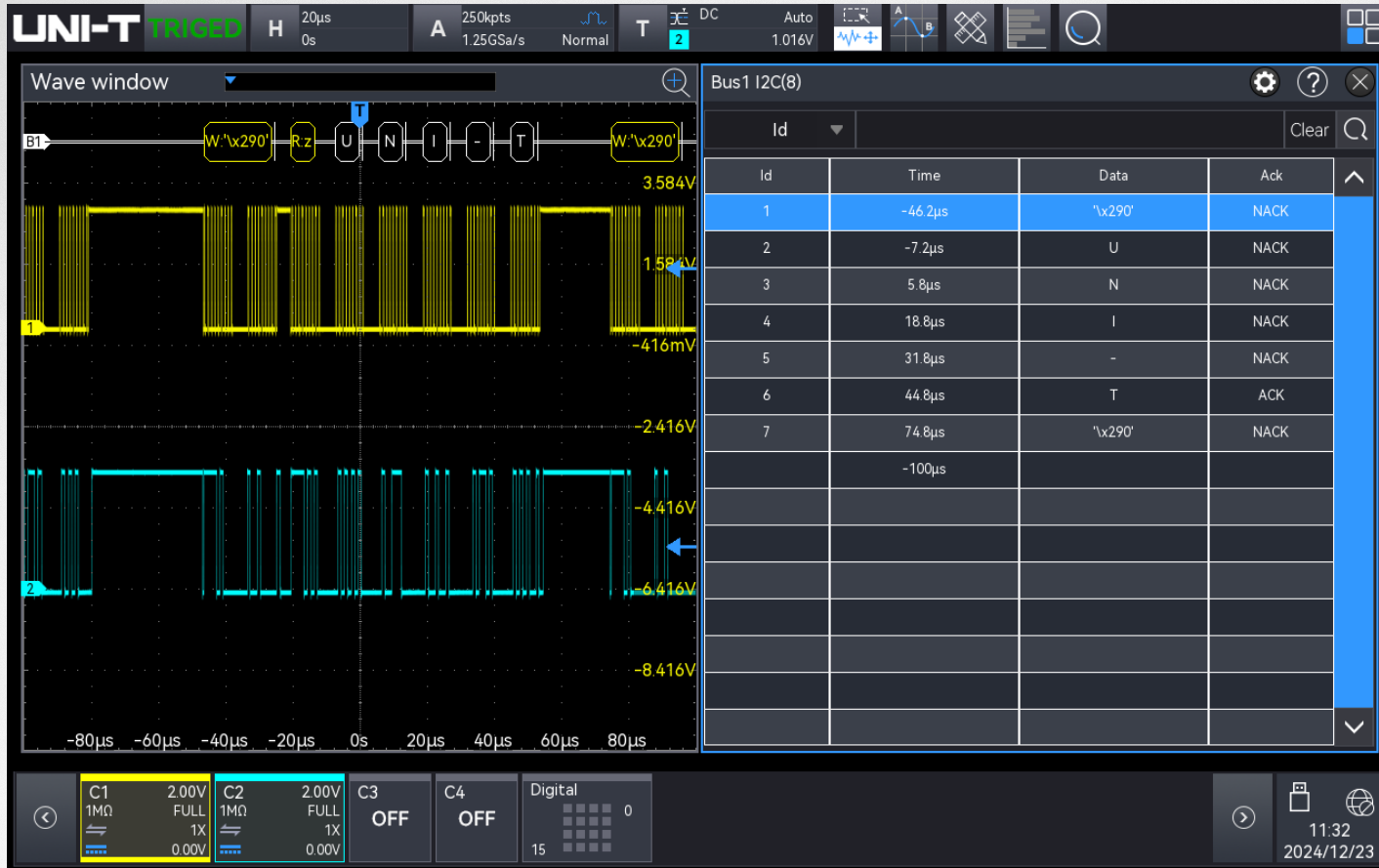
Product Features

> ➢ **Ultra Phosphor 3.0**
>
> supports **8**-channel parallel graph mapping, the processing rate is up to **20 Gbps**, the waveform capture rate is up to 800,000 wfms/s, and up to 1,500,000 wfms/s in the sequence mode.

Product Features

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➤ Protocol Analyzer

15 kinds of trigger protocol and decoding, which including the field of computer, embedded serial bus, automobile, aerospace and audio

Computer serial bus	RS-232/422/485/UART	Standard
Embedded serial bus	I2C, SPI	Standard
Automobile serial bus	CAN	Standard
	LIN	Standard
	CAN_FD	Option
	CAN_KL	Option
	FlexRay	Option
Automobile sensor bus	SENT	Option
Audio serial bus	I2S, LJ, RJ, TDM	Option
Aerospace serial bus	MIL-STD-1553, ARINC 429	Option
Wireless communication	Manchester	Option
Sensor bus	**1-WIRE**	Option
Embedded serial bus	**I3C**	Option

Product Features
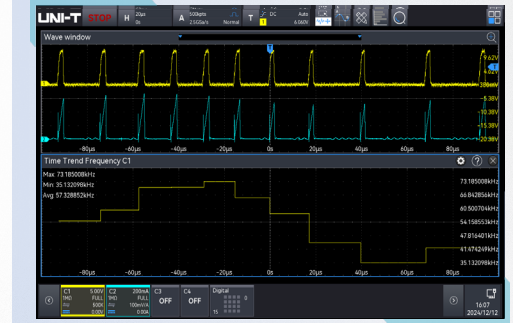
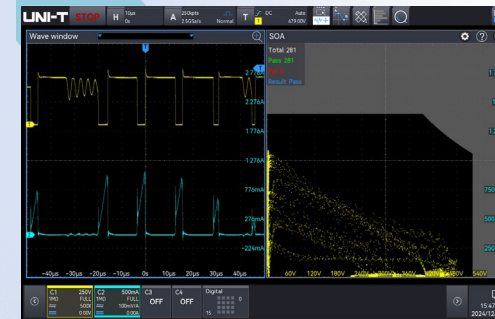**UNI-T®**

➢ **Power Analyzer**

Input Analysis
• Power Quality
• Harmonic Analysis
• Inrush Current

Switching Analysis
•Switching Loss
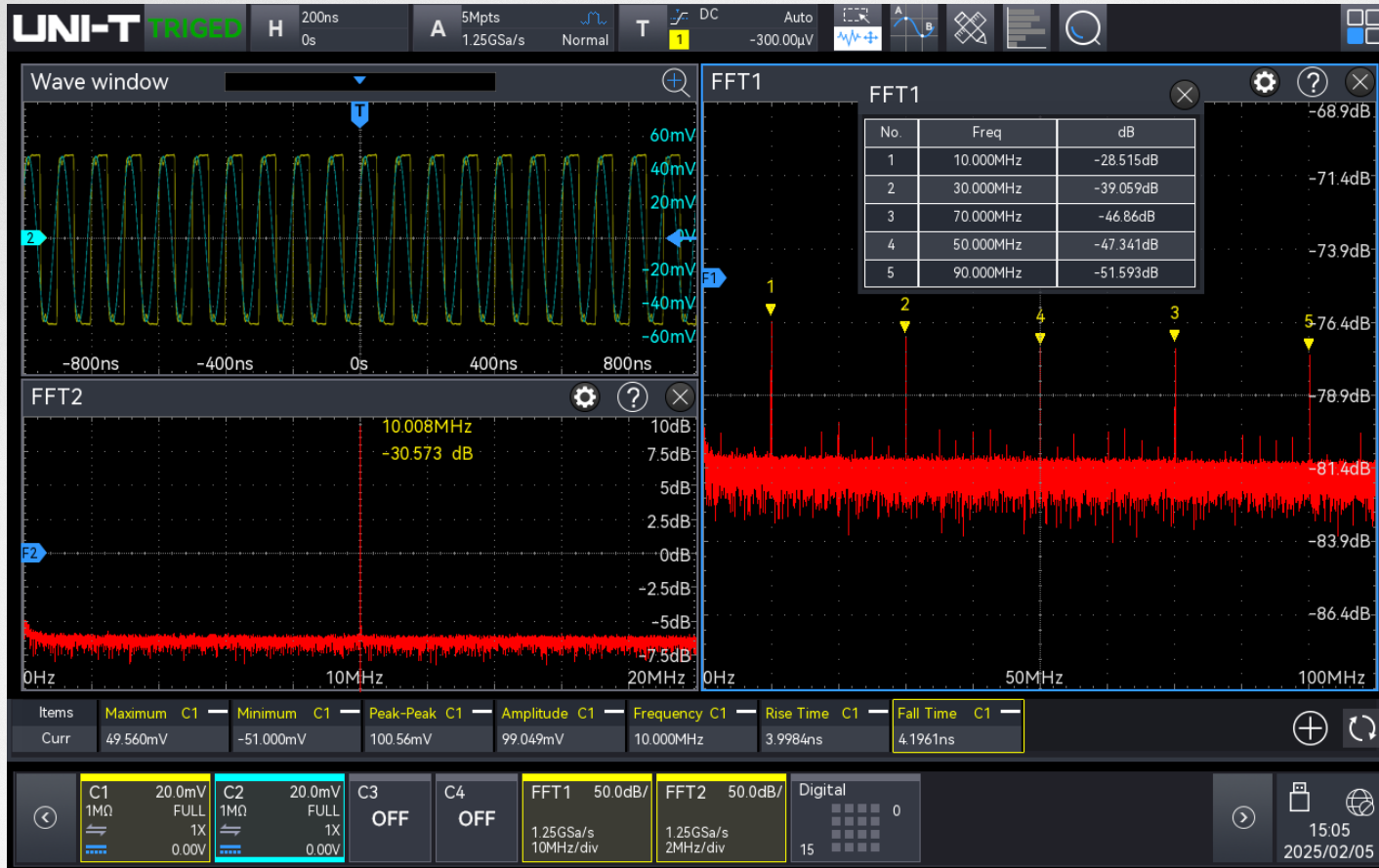•Safe Operating Area (SOA)
•Slew Rate
•Steady-State On-Resistance

Output Analysis
•Ripple Analysis
•Modulation Analysis
•Power Efficiency

Product Features

➤ **Spectrum Analyzer**

Standard enhanced FFT, up to 4 Mpts, 4 channels signal analysis

Product Features
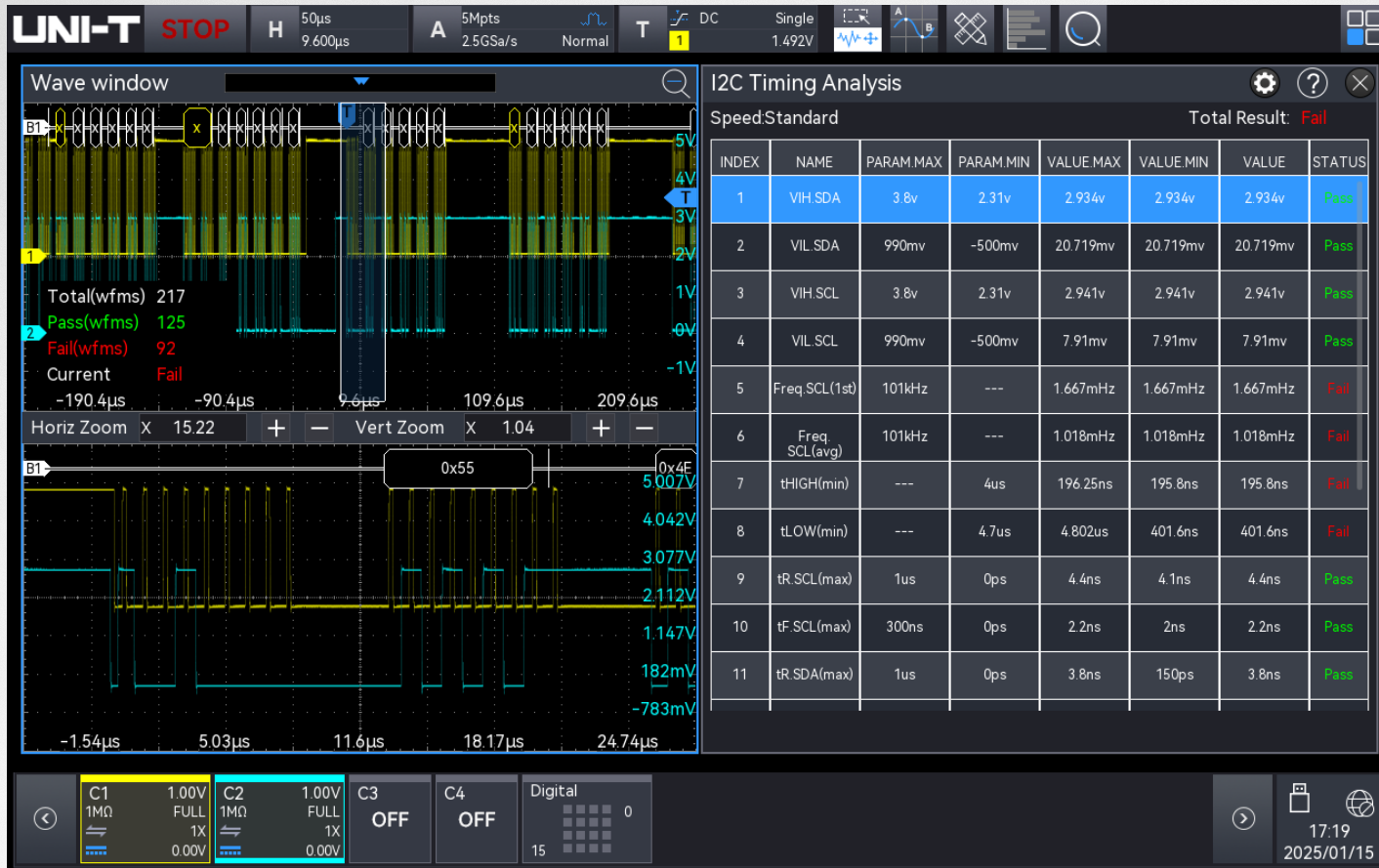
➢ **Timing analysis**

Protocol conformance analysis of I2C, SPI, CAN etc. signals and support for exporting test reports

Product Features

➢ **Multiple parameter measurements**

MSO5000HD series provides 56 kinds of measurement parameters. The parameter snapshot displays 39 kinds of test items for a single channel measurement

Product Features

➢ **FIR filter**

The bandwidth is continuously adjustable, effectively filtering out noise and interference within the 50 Hz to 500 MHz range.

Product Features

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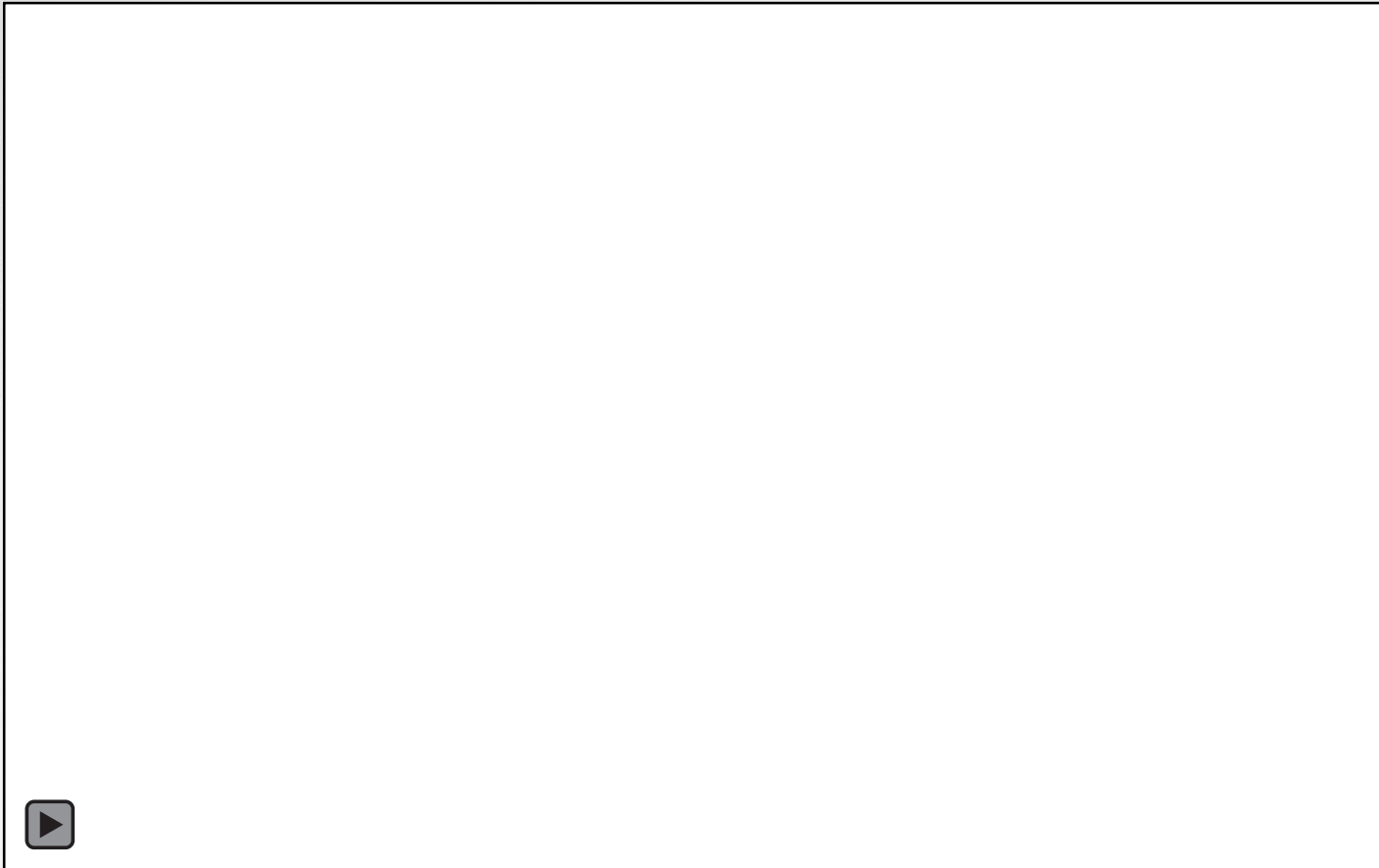
➢ **Full hardware real-time triggering**

13 advanced trigger types + 15 protocol trigger

types

New extreme value triggering technology.

Precisely locking signal extreme points.

Product Features
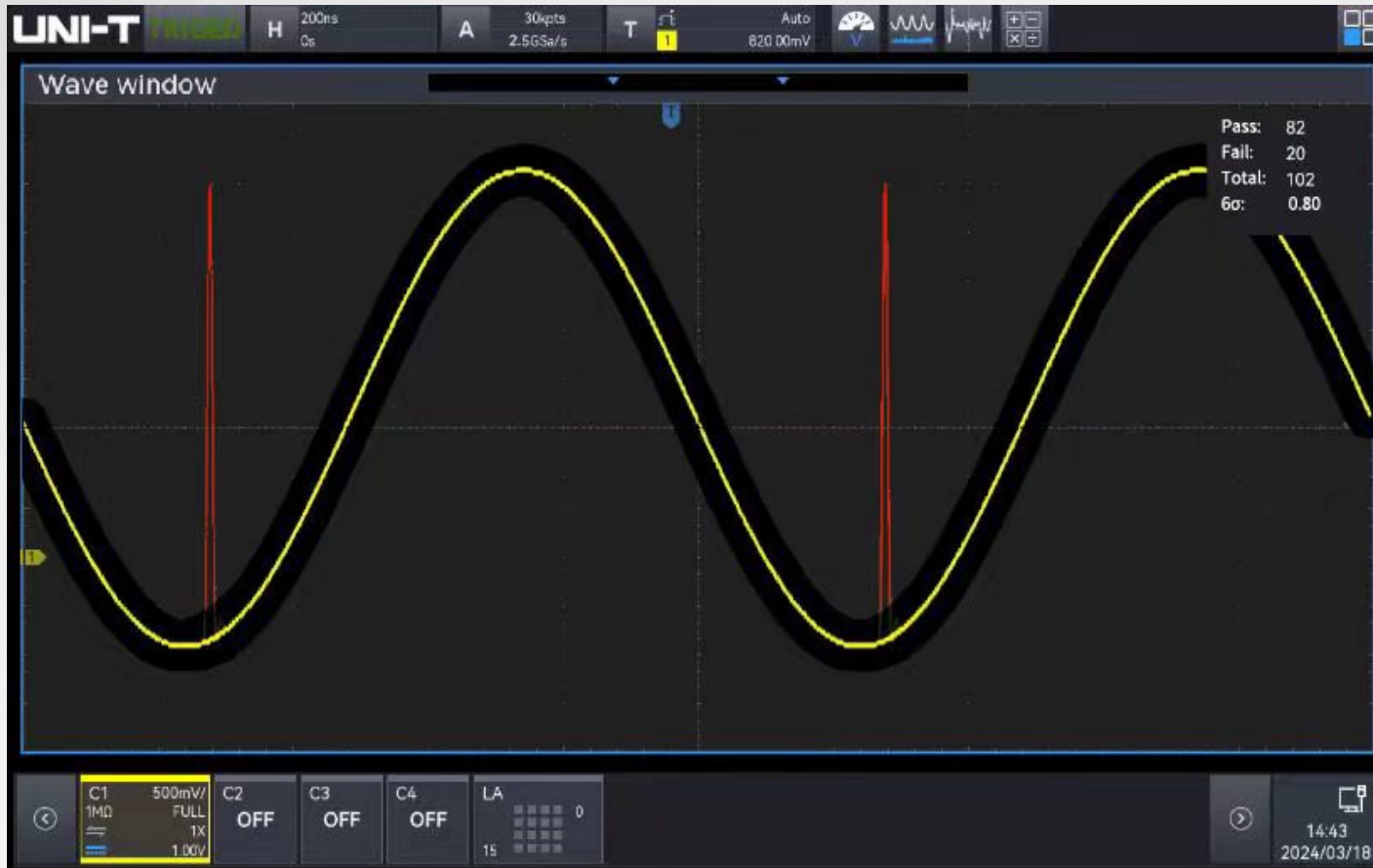
➢ **Mask Test**

Hardware accelerated mask test: **6σ standard < 1s**

Product Features
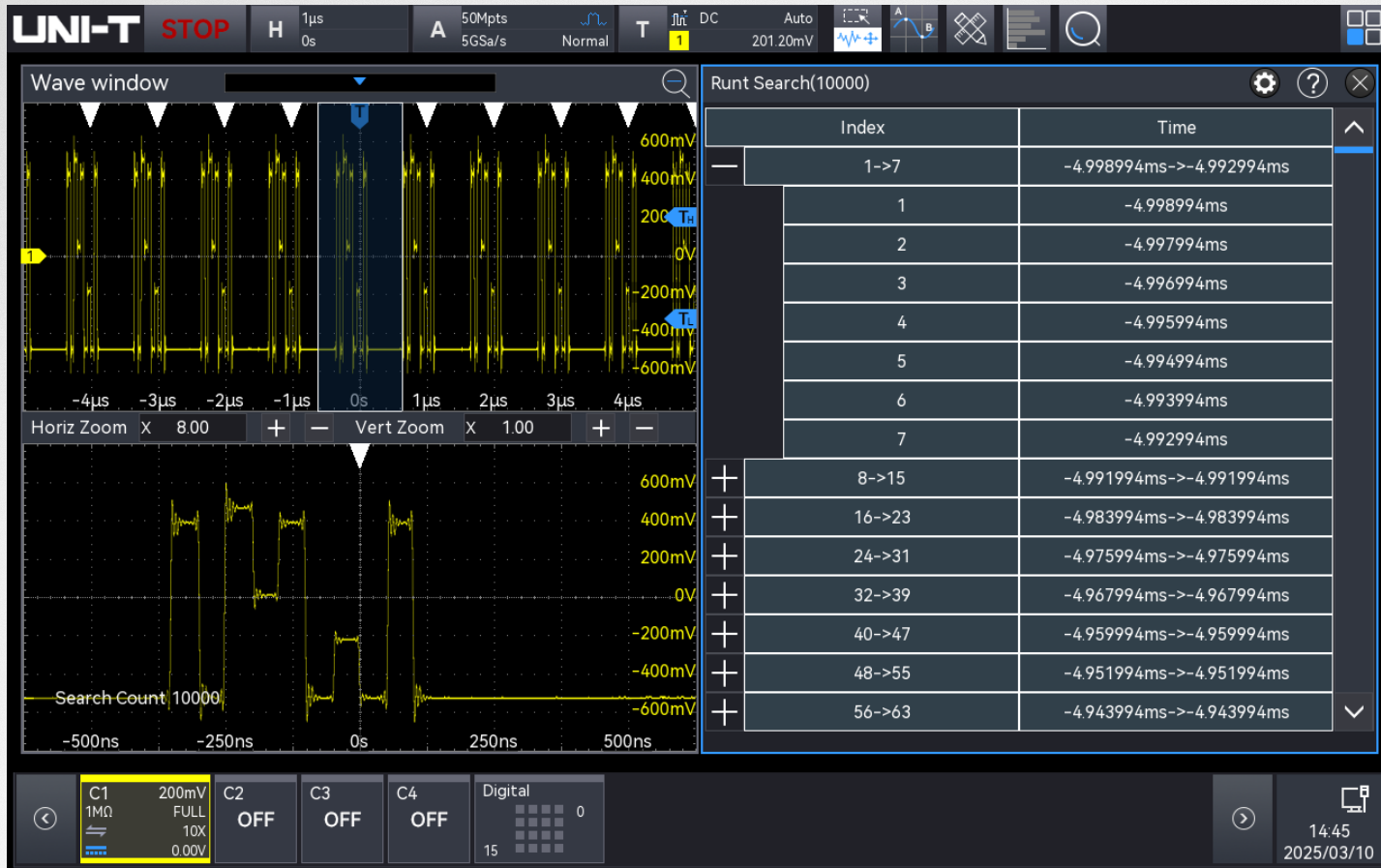
> ➢ **Navigate and Search**
>
> The search function helps you quickly find the waveforms of interest. Using the analyze function, events can be analyzed in detail, avoiding the time-consuming and inconvenient manual search

Product Features

➢ **WebServer**

SCPI for remote control

Remotely check and control

Export waveform file

Browse user manual on-line

PC/Mobil phone access

Selling Points

Feature	Advantage	Benefit
Ultra Phosphor 3.0	New software architecture with 5 - 10 times more data processing power than the old version. It supports 8-channel parallel graphic mapping, with a processing rate of up to 20 Gbps and a waveform capture rate of up to 800,000 wfms/s. sequential mode: 1,500,000 wfms/s.	Ultra high performance and convenient operation
12bit ADC, ERES 16bit	12-bit high-resolution ADC sampling has a quantization level of up to 4096, which is 16 times that of a traditional 8-bit ADC, allowing for better restoration of waveform details.	Applicable to more fields
Multifunctional oscilloscope	It is not only a high-performance oscilloscope, but also integrates 9 instrument functions into one, and the performance of the other 8 integrated instruments is equally superior.	One machine with multiple uses
15 protocol analysis	Covers triggering, decoding and analysis of various types of serial buses in computer serial ports, embedded interfaces, automobiles, aerospace and audio	Cover more areas
Power analysis	A variety of power analysis functions, providing a full range of power measurement and analysis solutions	Provide convenience for power product testing
Spectrum Analyzer	Enhanced FFT, 4Mpts, supports multiple windows, multiple frequency domain parameters for frequency domain analysis	Multi-purpose, cost-saving
AWG	Optional dual-channel equal performance function/arbitrary waveform generator, the highest frequency of 50MHz, to achieve the basic waveform generator function	Multi-purpose, cost-saving
Logic Analyzer	16 digital channels with sample rate up to 1.25 GSa/s for detailed analysis of digital logic signals	Multi-purpose, cost-saving
5 GSa/s sample rate	High sample rate can collect more waveform points and better restore the true situation of the waveform.	Can measure higher frequency signals
500 Mpts Memory depth	Memory depth up to 500Mpts, with a high capture rate, to store more waveform points for better analysis.	Improve the capture probability of occasional abnormal signals

Selling Points

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Feature	Advantage	Benefit
Sequence mode	Prioritize acquisition and subsequently do data processing and display to minimize the dead time of acquisition and achieve high capture	Effectively capture infrequent and abnormal signals
Active probe measurement	Supports active probe access, which is helpful for testing smaller and higher frequency signals	High frequency measurement
Hardware acceleration mask test	Hardware-accelerated template tests complete the 6σ standard test in 1s with no degradation in Ultra Phosphor 3.0 capture rate.	Faster completion of standard mask tests
56 parameter measurements	56 precision parameters are measured automatically, and advanced parameter statistics and trend graph visualization and analysis functions are integrated at the same time.	Enable professional-grade in-depth data analysis
Navigate and Search	Waveforms of interest can be quickly searched according to preset conditions, improving the speed of waveform obtainment and analysis.	Improve test efficiency
Multiple window display	Flexible desktop display area can be arranged as needed. Equipped with 15.6-inch large screen, display content more delicate and flexible	Show more, as you need
Web Server	You can easily access and operate the oscilloscope on the web page, and it supports both computer and mobile platforms.	Remote control anytime, anywhere
10.1 inch touch screen	Large high-definition display screen, combined with multi-point and multi-gesture touch operations, displays more content and makes operation more convenient	Superior user experience
USB3.0 port	Both Host and Device interfaces are 3.0 ports, which makes data transmission and remote interaction faster.	Faster Interface

Applications

Power Test

Low-power Test

Semiconductor Test
GaN

Medical Electronics

Order Information-I

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	Description	Product Size	Product Net Weight	Standard Quantity per Carton	Order No.
MSO5000HD	1 GHz Bw, 12bit, 4+16 CH, Max. 5 GSa/s, memory depth: 500 Mpts, 800,000 wfm/s, 10.1" Touch screen	361 mm×209 mm×106 mm	3.97 kg	1 pcs	MSO5104HD
	500 MHz Bw, 12bit, 4+16 CH, Max. 5 GSa/s, memory depth: 500 Mpts, 800,000 wfm/s, 10.1" Touch screen	361 mm×209 mm×106 mm	3.97 kg	1 pcs	MSO5054HD
	350 MHz Bw, 12bit, 4+16 CH, Max. 5 GSa/s, memory depth: 500 Mpts, 800,000 wfm/s, 10.1" Touch screen	361 mm×209 mm×106 mm	3.97 kg	1 pcs	MSO5034HD
Standard accessories	National standard cable	1.8m	--	1 pcs	--
	Passive probe (500 MHz/350 MHz)	--	--	4 pcs	UT-P07A/UT-P08A
	BNC-BNC direct-through line	1m	--	1 pcs	UT-L45
	BNC-Red and Black Alligator Clip Connection Cable	1m		1 pcs	UT-L02A
	USB3.0 Data Cable	1m	--	1 pcs	UT-D30

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Order Information-II

	Description	Order No.
Licensed Options	350MHz Upgrade to 500MHz Bandwidth	MSO5000HD-BW3M5T5M
	350MHz Upgrade to 1 GHz Bandwidth	MSO5000HD-BW3M5T1G
	500MHz Upgrade to 1 GHz Bandwidth	MSO5000HD-BW5MT1G
	All serial bus triggering and decoding options	MSO5000HD-BND
	Automobile serial bus triggering and decoding option （CAN, CAN-FD, LIN, FlexRay, SENT）	MSO5000HD-AUTO
	CAN-FD: Automotive serial bus triggering and decoding	MSO5000HD-CAN-FD
	FlexRay: Automotive Serial Bus Trigger and decoding	MSO5000HD-FLEX
	SENT: Automotive sensor serial bus triggering and decoding option	MSO5000HD-SENT
	Audio: Audio serial bus triggering and decoding option	MSO5000HD-AUDIO
	MIL-STD-1553: Aerospace serial bus triggering and decoding	MSO5000HD-MIL1553
	ARINC429: Aerospace serial bus triggering and decoding	MSO5000HD-ARINC429
	MANCHESTER: Wireless communication serial bus triggering and decoding	MSO5000HD-MANCH
	1-WIRE: Triggering and decoding	MSO5000HD-1WIRE
	I3C: Triggering and decoding	MSO5000HD-I3C
	CAN-XL: Triggering and decoding	MSO5000HD-CANXL
	Dual channel function/arbitrary waveform generator	MSO5000HD-AWG
	Power analysis	MSO5000HD-PWR
	Time sequence analyzer	MSO5000HD-TIME

	Description	Order No.
Optional Probe	Active single-end probe (2 GHz;10 X)	UT-PA2000
	Passive high resistance probe (1X: 8 MHz;10X:500 MHz)	UT-P07A
	Passive high resistance probe (10X:350 MHz)	UT-P08A
	Passive high voltage probe (100 MHz; probe coefficient 100:1,1.5 kVrms)	UT-P20
	Passive high voltage probe (100 MHz; 2 kVpp)	UT-V23
	Passive high voltage probe(40 MHz; maximum of operating voltage DC10kV/AC7kVrms)	UT-P21
	Current probe (100 kHz; 0.4 A - 60 A)	UT-P40
	Current probe (100 kHz; 0.4 A - 100 A)	UT-P41
	Current probe (150 kHz; 0.4 A - 200 A)	UT-P42
	Current probe (25 MHz; maximum of measurement current 20 A)	UT-P43
	Current probe (50 MHz; maximum of measurement current 40 A)	UT-P44
	Current probe (100 MHz; maximum of measurement current 30 A)	UT-P4030D
	Current probe (12 MHz; maximum of measurement current 150 A)	UT-P4150
	Current probe (5 MHz; maximum of measurement current 500 A)	UT-P4500
	Current probe (600 kHz; maximum of measurement current 100 A)	UT-4100A
	Current probe (2 MHz; maximum of measurement current 100 A)	UT-4100B
	High voltage differential probe (100 MHz; ±800 Vpp)	UT-P30
	High voltage differential probe (100 MHz; ±1.5 kVpp)	UT-P31
	High voltage differential probe (50 MHz; ±3 kVpp)	UT-P32
	High voltage differential probe (120 MHz; ±14 kVpp)	UT-P33
	High voltage differential probe (50 MHz; 1.3 kV)	UT-P35
	High voltage differential probe (50 MHz; 5.6 kV)	UT-P36
	16-channel logic analyzer probe	UT-M15
Optional Accessories	Isolation transformer for Bode plot application (Hardware)	UT-ISOT

UNI-TREND TECHNOLOGY CO., LTD.

Stock code: 688628

Please visit instruments.uni-trend.com for the latest product portfolios.